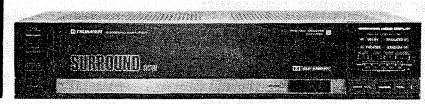
PIONEER®

Service Manual

REPAIR & ADJUSTMENTS



ORDER NO.
ARP1015-0

SURROUND AMPLIFIER

SP-X707(BK)

MODEL SP-X707 (BK) COMES IN FOUR VERSIONS DISTINGUISHED AS FOLLOWS:

Type	Power requirement	Destination
KUC	AC120V only	U.S.A. and Canada
HEZ	AC220V, 240V (switchable)	West Germany
HB	AC220V, 240V (switchable)	United Kingdom
S/G	AC110V, 120V, 220V, 240V (switchable)	U.S. Military

- This service manual is applicable to the KUC type.
- As to the HEZ, HB and S/G types, please refer to the additional service manual (ARP1017).
- As to the other types, please refer to the additional service manual.
- As to the circuit description, please refer to the SP-X707 (BK) service manual (ARP1016).
- Ce manuel d'instruction se refère au mode de réglage en français.
- Este manual de servicio trata del método ajuste escrito en español.

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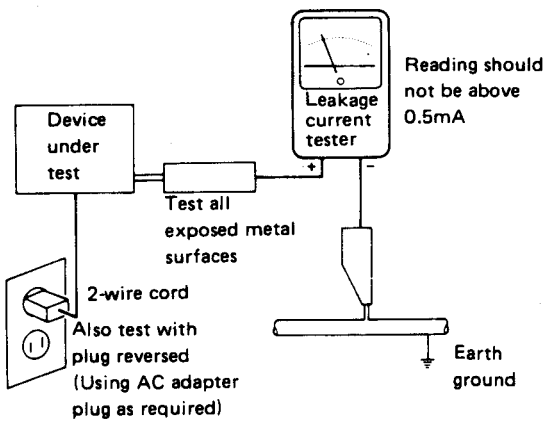
SAFETY INFORMATION

1. SAFETY PRECAUTIONS

The following check should be performed for the continued protection of the customer and service technician.

LEAKAGE CURRENT CHECK

Measure leakage current to a known earth ground (water pipe, conduit, etc.) by connecting a leakage current tester such as Simpson Model 229-2 or equivalent between the earth ground and all exposed metal parts of the appliance (input/output terminals, screwheads, metal overlays, control shaft, etc.). Plug the AC line cord of the appliance directly into a 120V AC 60Hz outlet and turn the AC power switch on. Any current measured must not exceed 0.5mA.


Reading should not be above 0.5mA
Leakage current tester
Device under test
Test all exposed metal surfaces
2-wire cord
Also test with plug reversed (Using AC adapter plug as required)
Earth ground

AC Leakage Test

ANY MEASUREMENTS NOT WITHIN THE LIMITS OUTLINED ABOVE ARE INDICATIVE OF A POTENTIAL SHOCK HAZARD AND MUST BE CORRECTED BEFORE RETURNING THE APPLIANCE TO THE CUSTOMER.

2. PRODUCT SAFETY NOTICE

Many electrical and mechanical parts in the appliance have special safety related characteristics. These are often not evident from visual inspection nor the protection afforded by them necessarily can be obtained by using replacement components rated for voltage, wattage, etc. Replacement parts which have these special safety characteristics are identified in this Service Manual.

Electrical components having such features are identified by marking with a ⚠ on the schematics and on the parts list in this Service Manual.

The use of a substitute replacement component which dose not have the same safety characteristics as the PIONEER recommended replacement one, shown in the parts list in this Service Manual, may create shock, fire, or other hazards.

Product Safety is continuously under review and new instructions are issued from time to time. For the latest information, always consult the current PIONEER Service Manual. A subscription to, or additional copies of, PIONEER Service Manual may be obtained at a nominal charge from PIONEER.

1. SPECIFICATIONS

Amplifier Section

Continuous average power output is 30 watts* per channel, min., at 8 ohms from 100 Hertz to 6,000 Hertz with no more than 3% total harmonic distortion.

Continuous Power Output (both channels driven)
T.H.D. 1%, 1 KHz, 8Ω ..... 35W per channel
Input (Sensitivity/Impedance)
INPUT, TAPE PLAY..... 150 mV/50 KΩ
Output (Level/Impedance)
OUTPUT (FIX)..... 150 mV/2.2 KΩ
OUTPUT (VAR) ..... 1 V/2.2 KΩ
OUTPUT (Surround LINE OUT) ..... 1 V/1 KΩ
OUTPUT (Center)..... 1 V/5 KΩ
Surround Mode ....DD Surround/Theater/Stadium/Simulated
Auxiliary Circuit ..... Super bass, dynamic expander
Hum and Noise (IHF, short circuited, A network, VR max., with S.B. and EXP set to OFF at in Surround Theater)
OUTPUT (VAR, 1V, 0 dB) ..... 88 dB
SP OUT (30W/8 Ω 0 dB)..... 68 dB

Manufactured under license from Dolby Laboratories Licensing Corporation. Additionally licensed under one or more of the following patents: U.S. numbers 3,632,886, 3,746,792 and 3,959,590; Canadian numbers 1,004,603 and 1,037,877. "Dolby" and the double-D symbol are trademarks of Dolby Laboratories Licensing Corporation.

Power Supply/Miscellaneous

Power requirements
U.S., Canadian models ..... AC 120V, 60 Hz
European models..... a.c. 220 Volts ~ 50/60 Hz

Power consumption
U.S., Canadian models..... 160W (UL, CSA)
European models ..... 250 Watts
Dimensions..... 360 (W) x 75 (H) x 332 (D) mm
14-1/4(W) x 2-15/16(H) x 13-1/16(D) in
Weight..... 5.7 Kg (12 lb 9 oz)

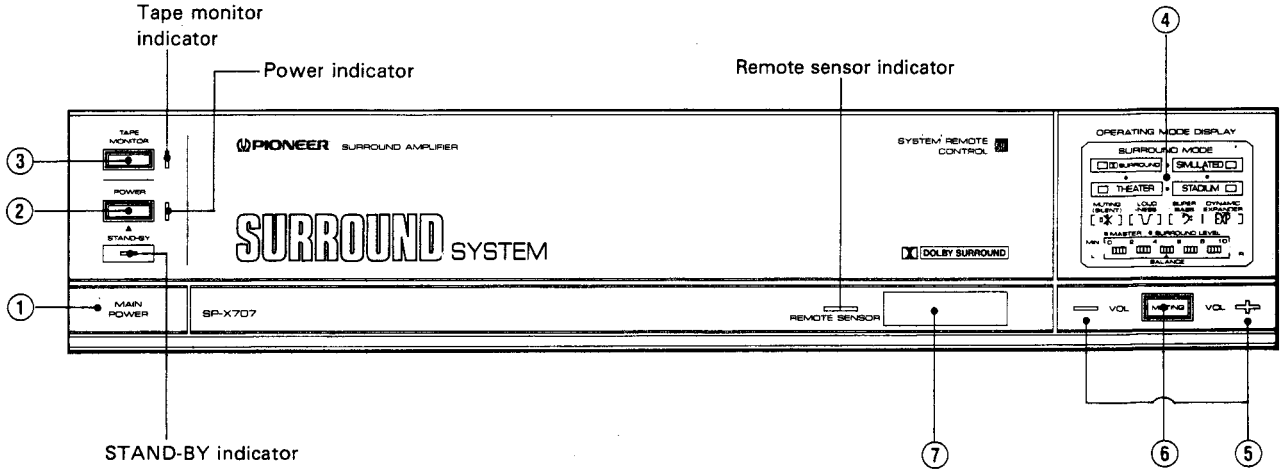
Accessories

Connecting cords with pin plug (gray and black)..... 2
Remote control unit 1
Size "AA" (R6) dry cell batteries..... 2
Operating instructions 1

NOTE:

- *Specifications and design subject to possible modification without notice due to improvements.*
- **Measured pursuant to the Federal Trade Commission's Trade Regulation rule on Power Claims for Amplifier.*

2. FRONT PANEL FACILITIES



① Main POWER switch/indicator

Pressing this switch turns the main power supply ON. The STAND-BY indicator lamp will illuminate in orange to let you know that the power supply is in the standby state; no sound will be output yet.
To turn the unit OFF, press this switch once more.

② POWER switch

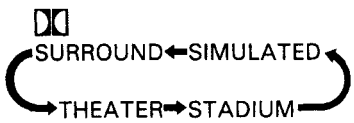
Press this switch after turning the main POWER switch ON. Turn off, power indicator will illuminate in green to let you know that the SP-X707 is now fully activated and ready for use. The accessory remote control unit and the audio-video master amplifier remote control unit can also now be used to operate the SP-X707.

③ TAPE MONITOR switch

Press this switch ON (Tape monitor indicator "ON") when playing back music from the tape deck connected to the unit's TAPE terminals. At other times, press the switch once more (Tape monitor indicator "OFF").

④ OPERATING MODE DISPLAY (SURROUND MODE)

The mode can be changed in the cycle shown below by repeatedly pressing the surround mode key on the accessory remote control or the full remote control unit:



This mode can also be turned ON or OFF by means of the remote control units.
The indicators at the bottom show the master volume, surround volume, and balance.
The operation of these functions is executed with the remote control unit: please consult the more detailed description presented on the next page.

⑤ VOLUME switches

Use these to adjust the volume.
[+]: This turns the volume up.
[−]: This turns the volume down.

⑥ MUTING switch

Use this switch to temporarily turn down the sound completely.
This switch is ON when "MUTING" on the operating mode display lights, and in this mode no sound is heard.
The volume returns to its previous level when the switch is returned to the OFF position.

⑦ REMOTE SENSOR

This lights when it receives signals from the remote control unit.

REMOTE CONTROL UNIT

LOUDNESS switch
Use this switch when listening to sound at a low volume. The switch is ON when "LOUDNESS" on the operating mode display lights. In this mode, the bass and treble are boosted and the sound takes on an extra "punch" even at low volume levels.

SUPER BASS SWITCH
Press this switch to enjoy emphasized bass sound. Pressing it a second time turns this function off.

SURROUND MODE SELECTOR
By depressing these switches, 4 different surround sound effects can be selected.

DOLBY SURROUND:
This position is specially designed for watching movies on TV, particularly video tapes marked with the symbol, or those having the symbol shown at the end of the movie, indicating that the soundtrack was recorded using Dolby noise reduction. The SP-X707 contains a decoder designed to work with Dolby surround sources. The decoder works to reproduce sound with all the impact and presence of a movie theater, in your own home.

THEATER:
When listening to a movie music source with this switch position, you are treated to music sound like that enjoyed from a seat in a concert hall.

STADIUM:
Depress this switch when listening to live sports broadcasts, etc. The resulting sound will make you think you are sitting right in the stadium.

SIMULATED STEREO:
Depress this switch when using a monaural sound source. A full-breadth of rich sound can be enjoyed.

POWER switch
Turns power to the SP-X707 ON/OFF.

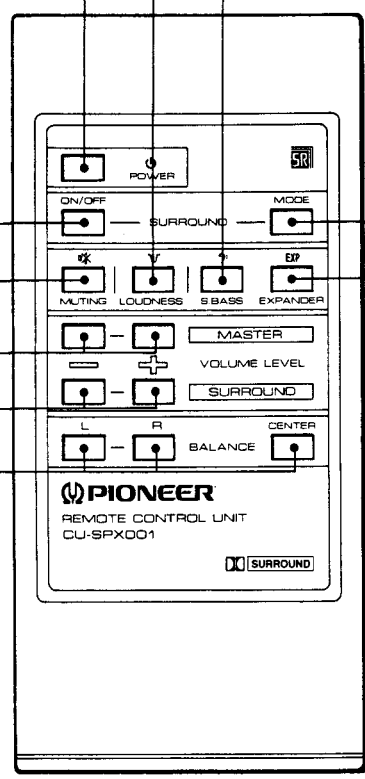
SURROUND ON/OFF switch
Turns surround ON/OFF.

MUTING switch
Use to temporarily cut off all sound.

MASTER VOLUME LEVEL control
Use these to adjust the volume.
[+]: This press the volume up.
[−]: This press the volume down.

SURROUND VOLUME LEVEL control

NOTE:
The SURROUND switch must be ON for these controls to work.



EXPANDER switch
Set to this switch when not using the rear surround speakers in order to produce surround effects from the front speakers alone. In this way, you can enjoy sound with a natural breadth and an added sense of depth without spoiling the important sound image placement. The surround effect can be adjusted by using the surround volume control.

BALANCE switches
Normally, the BALANCE indication on the operating mode display is kept at its center position (setting is made here by pressing CENTER). Adjust these switches when the volume tends to be louder at the left or right. If it is too loud at the right, press L; if it is too loud at the left, press R.

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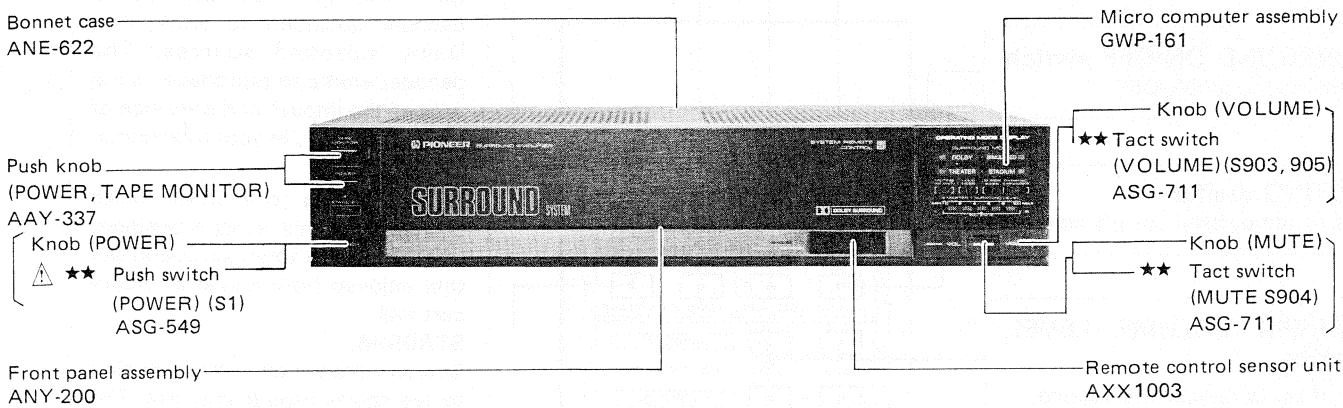
The Loudness, Super Bass, and Expander functions cannot all be used together. The Expander cannot be used together with Dolby surround. Also, the loudness function does not work with surround output and "output fixed (FIX)".

3. PARTS LOCATION

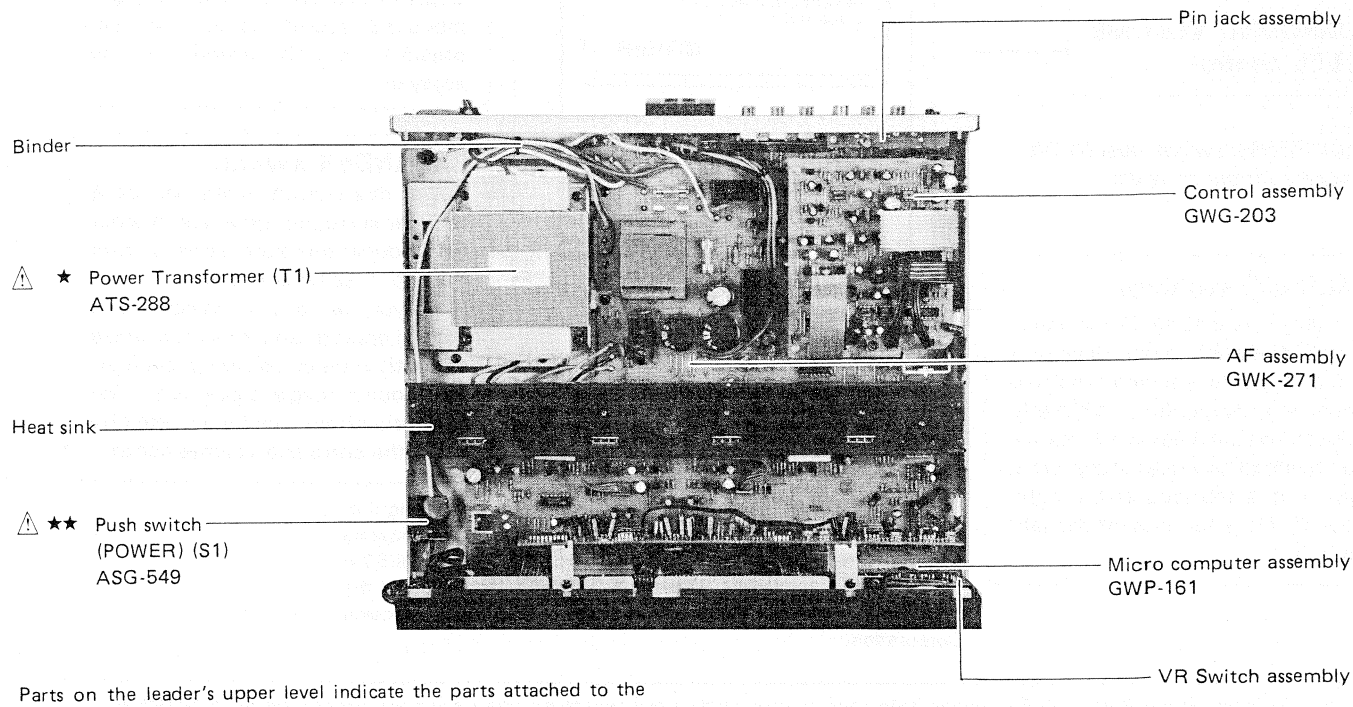
NOTES:

- *The ⚠ mark found on some component parts indicates the importance of the safety factor of the part. Therefore, when replacing, be sure to use parts of identical designation.*
- *For your Parts Stock Control, the fast moving items are indicated with the marks ★★ and ★.*
  ★★ GENERALLY MOVES FASTER THAN ★
  This classification shall be adjusted by each distributor because it depends on model number, temperature, humidity, etc.
- *Parts marked by " ⊙ " are not always kept in stock. Their delivery time may be longer than usual or they may be unavailable.*

Front Panel



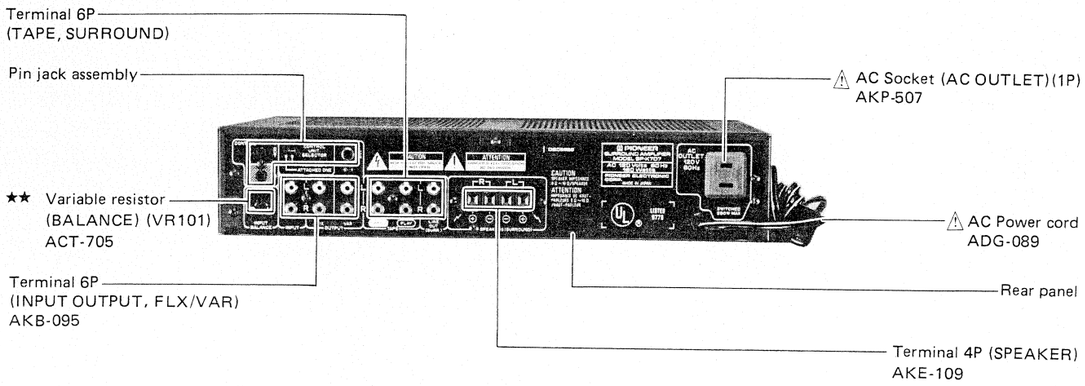
Top View with Bonnet Case Removed

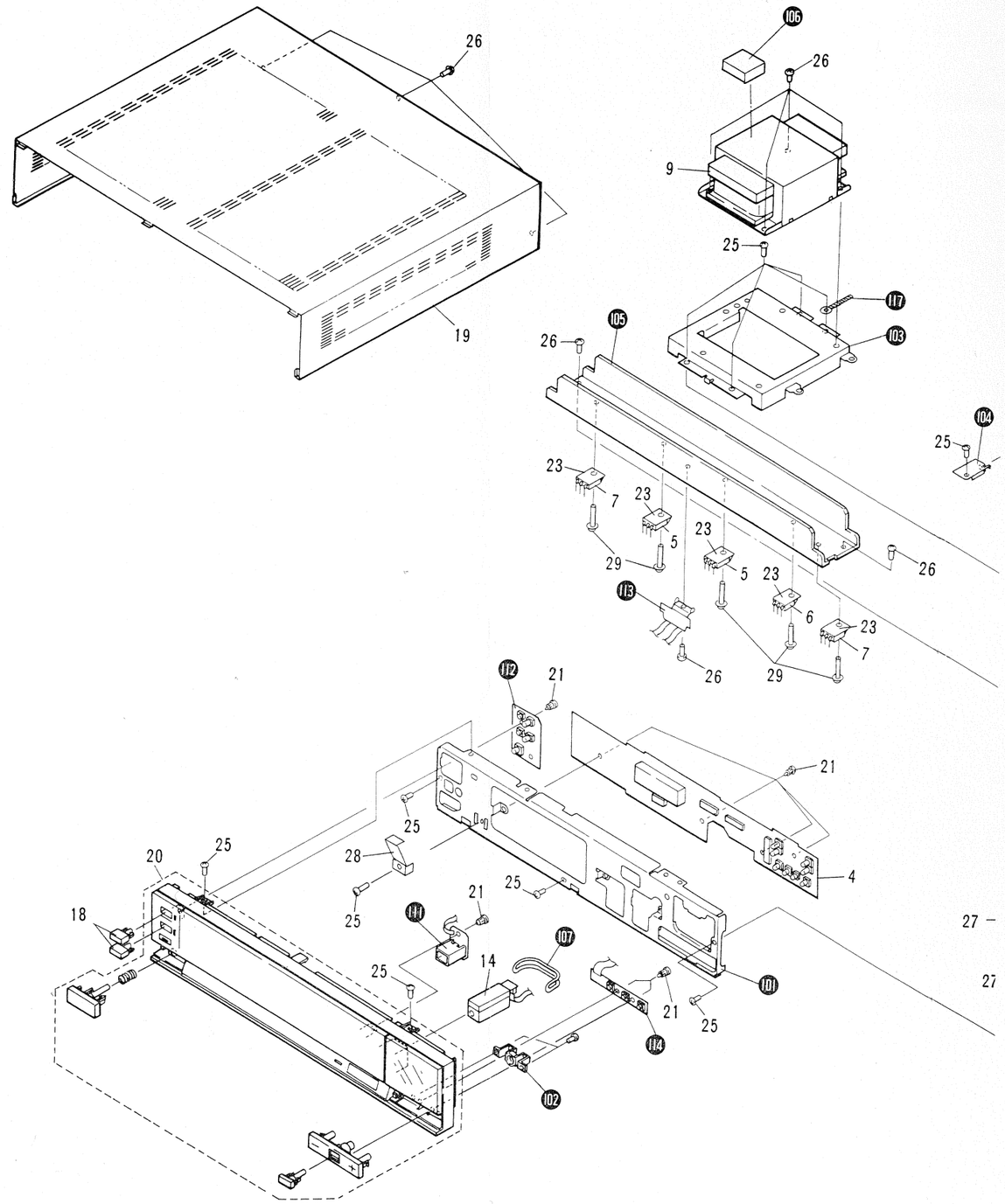


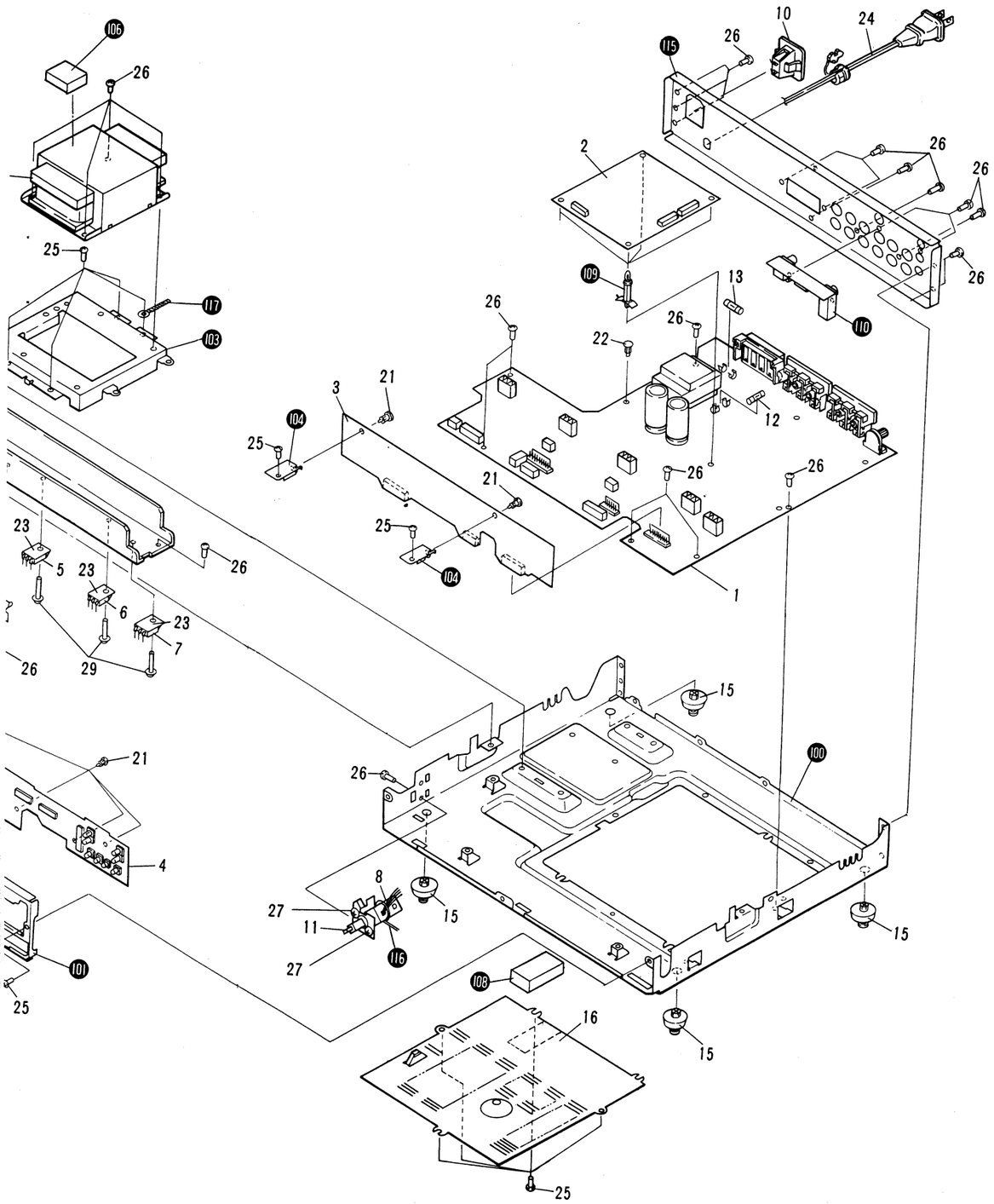
Parts on the leader's upper level indicate the parts attached to the front side of the front panel. Parts on the leader's lower level indicate the parts attached to the back side of the front panel.

4. EXPLODED VIEWS AND PARTS LIST

Rear Panel







NOTES:

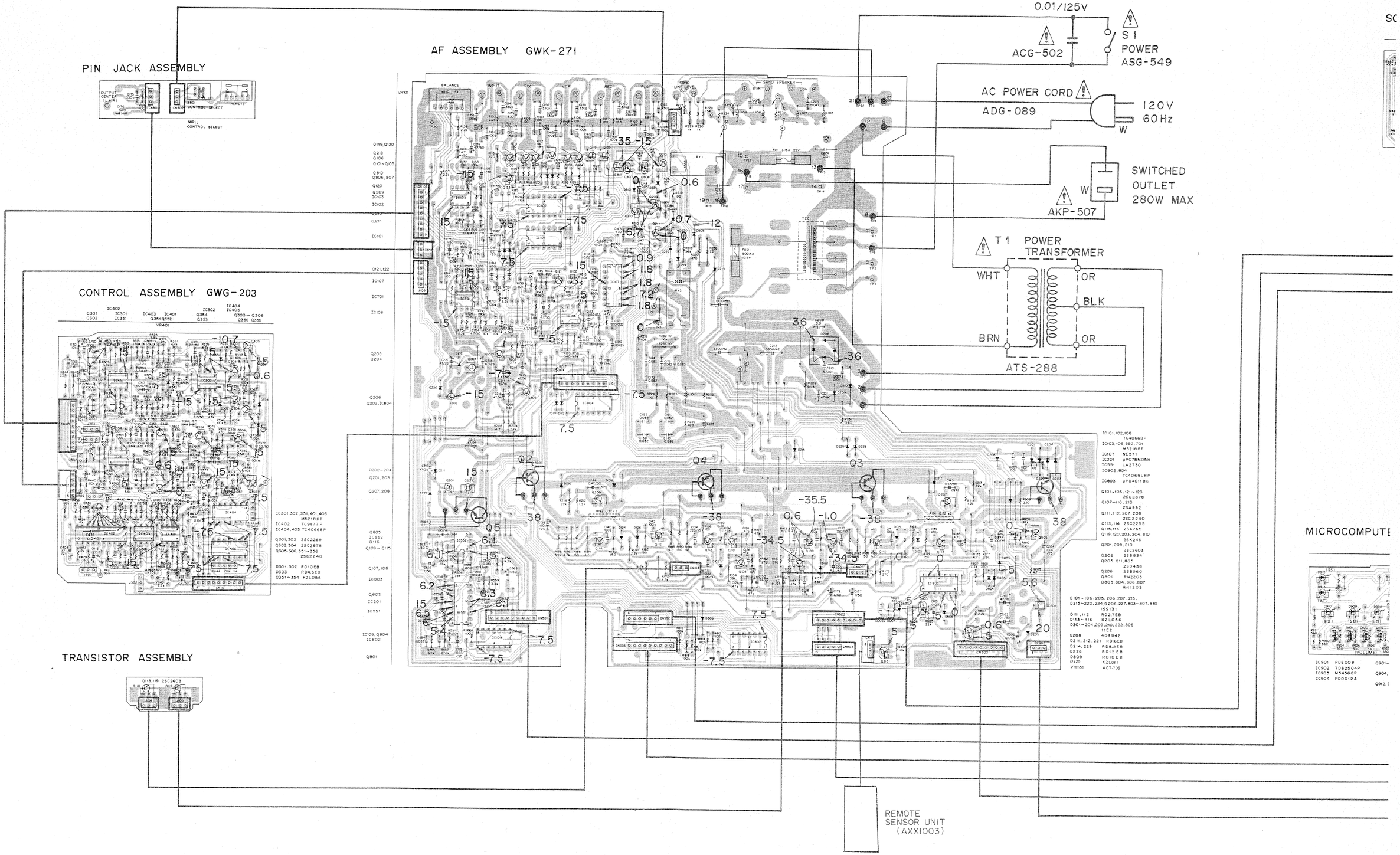
- *Parts without part number cannot be supplied.*
- *The ⚠ mark found on some component parts indicates the importance of the safety factor of the part. Therefore, when replacing, be sure to use parts of identical designation.*
- *For your Parts Stock Control, the fast moving items are indicated with the marks ★★ and ★.*
  ★★ GENERALLY MOVES FASTER THAN ★
  This classification shall be adjusted by each distributor because it depends on model number, temperature, humidity, etc.
- *Parts marked by " ⊙ " are not always kept in stock. Their delivery time may be longer than usual or they may be unavailable.*

Parts List

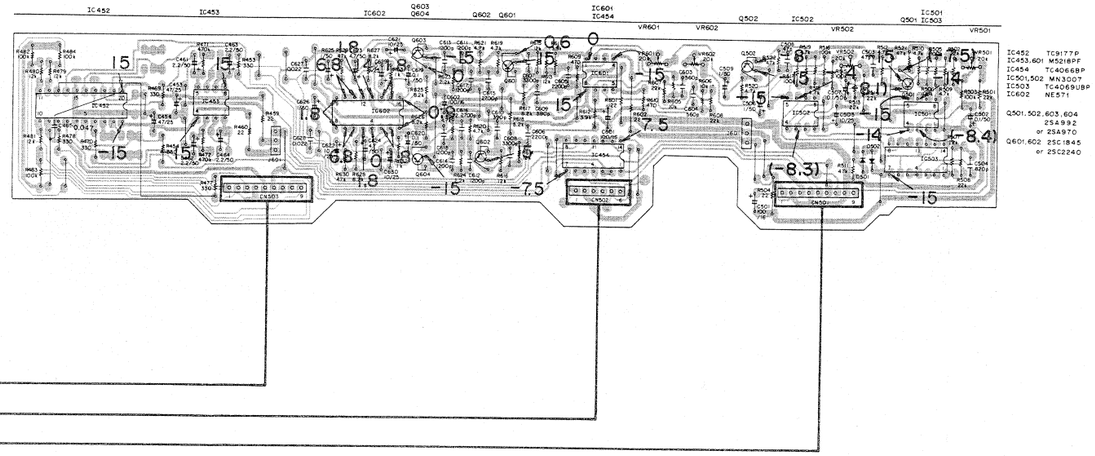
Mark	No.	Part No.	Description
	1	GWK-271	AF assembly
	2	GWG-203	Control assembly
	3	GWG-204	Surround control assembly
	4	GWP-161	Micro computer assembly
★★	5	2SA1104(A)	Transistor (Q2, Q4)
★★	6	2SC2577(A)	Transistor (Q5)
★★	7	2SC2579(A)	Transistor (Q1, Q3)
⚠	8	ACG-502	Ceramic capacitor (C1)
⚠ ★	9	ATS-288	Power transformer (AC120V) (T1)
⚠	10	AKP-507	AC Socket (1P) (AC OUTLET)
⚠ ★★	11	ASG-549	Push switch (POWER) (S1)
⚠ ★★	12	AEK-124	Fuse (3.15A)(FU1)
⚠ ★★	13	AEK-136	Fuse (500mA)(FU2)
	14	AXX1003	Remote control sensor unit
	15	AEP-320	Leg assembly
	16	ANF1002	Bottom plate
	17	.....	.....
	18	AAY-337	Push knob
	19	ANE-622	Bonnet case
	20	ANY-200	Front panel assembly
	21	AEC-384	Nylon rivet
	22	AEC-525	Nylon rivet
	23	AEC-818	Mica sheet
⚠	24	ADG-089	AC Power cord
	25	BBZ30P060FZK	Screw
	26	BBZ30P080FZK	Screw
	27	VMZ30P060FMC	Screw
	28	ABH-139	Spring
	29	ABA-258	Screw

Mark	No.	Part No.	Description
	100		Chassis
	101		Panel stay
	102		SW Holder
	103		Transformer holder
	104		P.C.B. Holder
	105		Heat sink
	106		Cushion rubber B
	107		Rubber ring
	108		Cushion rubber
	109		P.C.B. Support B
	110		Pin jack assembjy
	111		LED Assembly
	112		Power SW Assembly
	113		Transistor assembly
	114		VR SW Assembly
	115		Rear panel
	116		Binder
	117		Binder

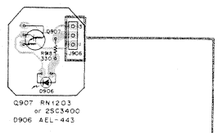
5. P.C.BOARDS CONNECTION DIAGRAM



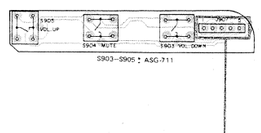
SORROUND CONTROL ASSEMBLY GWG-204



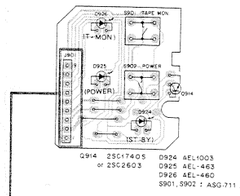
LED ASSEMBLY



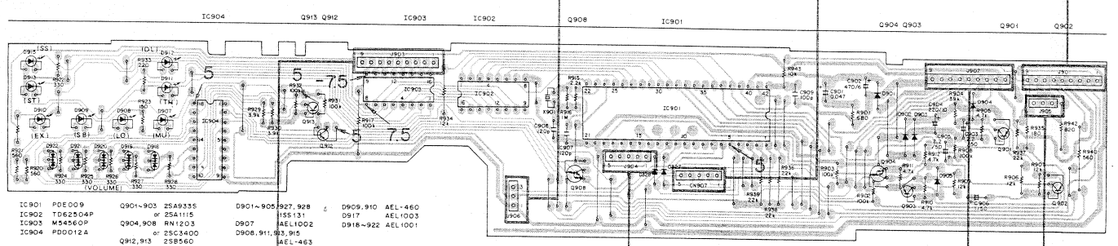
VR SW ASSEMBLY



POWER SW ASSEMBLY

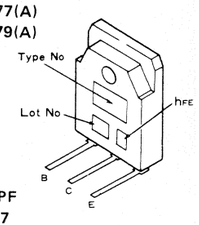


MICROCOMPUTER ASSEMBLY GWP-161



External Appearance of Transistors and ICs

2SA1104(A)
2SC2577(A)
2SC2579(A)



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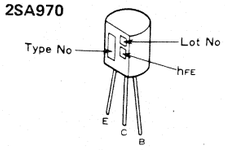
2SC2878
2SA970



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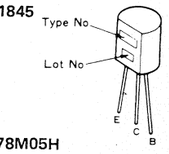
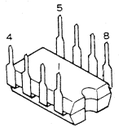
2SC1845



A

M5218PF
MN3007



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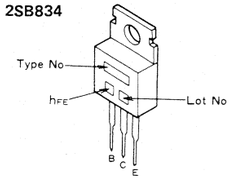
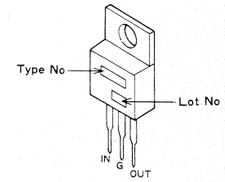
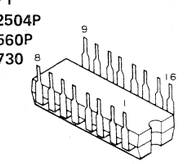


μPC78M05H



NE571
TD62504P
M54560P
LA2730



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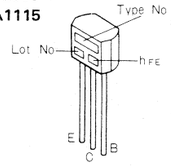

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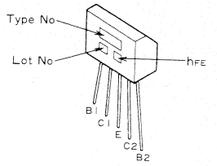

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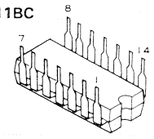
TC4066BP
TC4069UBP
UPD4011BC



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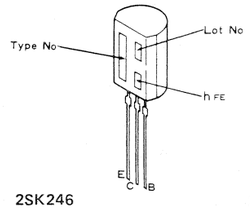
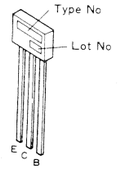


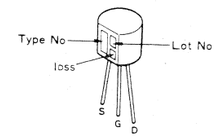
PD0012A

C

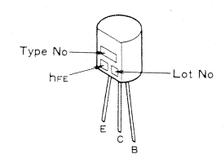
RN1203
RN2203
2SC3400



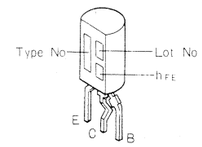
2SK246



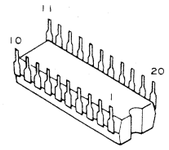
2SC1740S



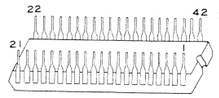
2SA965(A)
2SC2235(A)



TC9177P

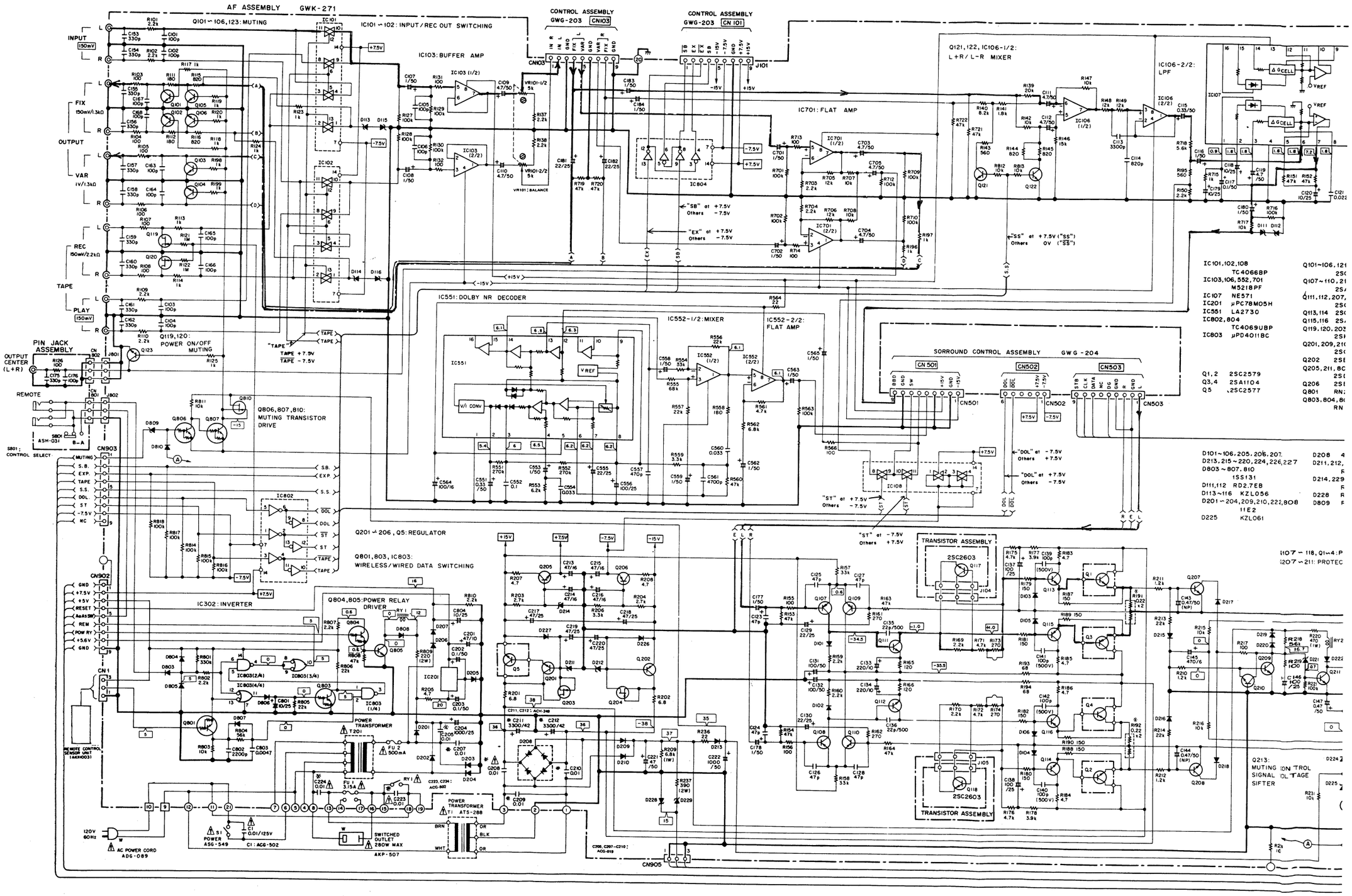


PDE009

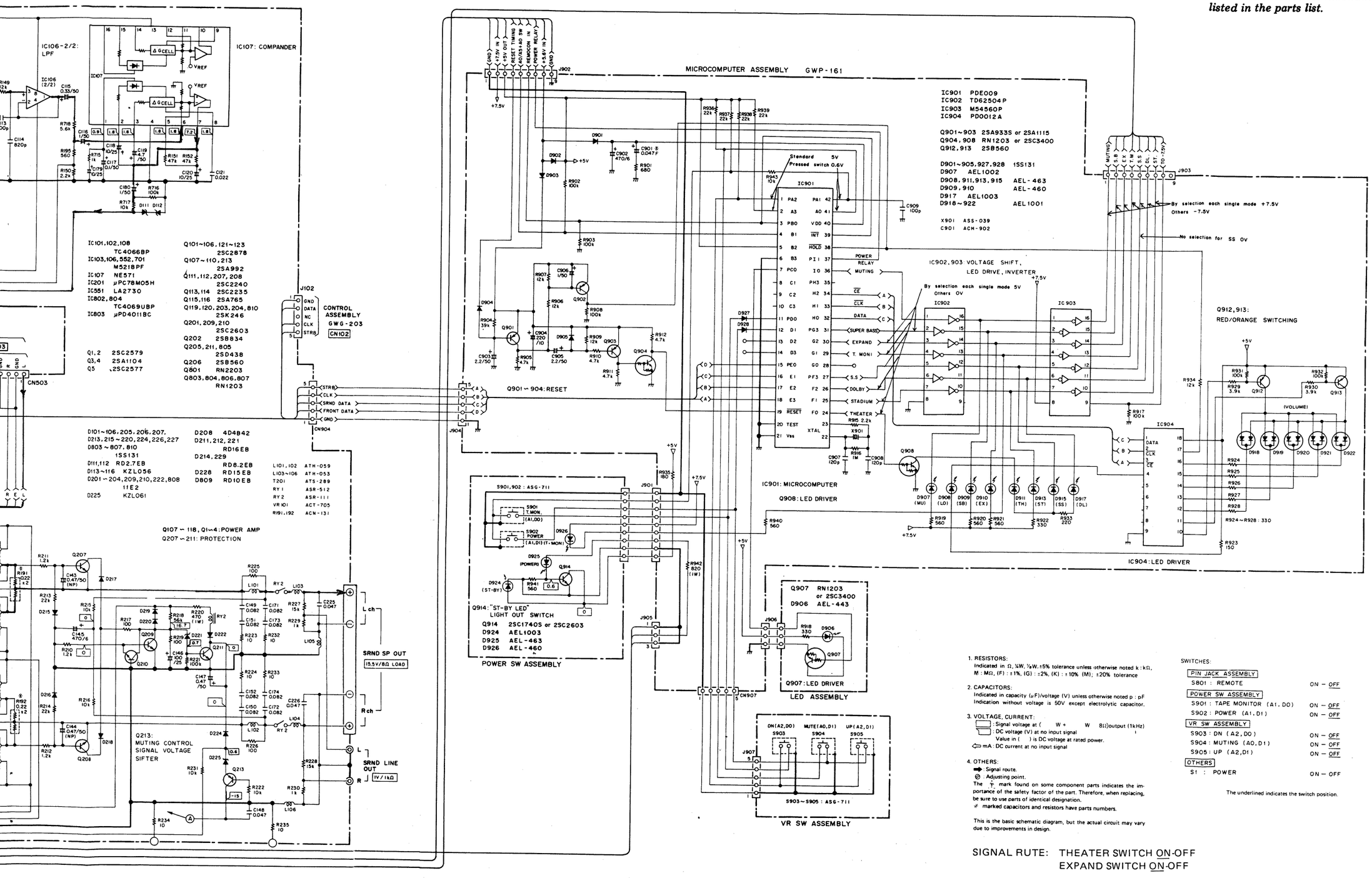


D

6. SCHEMATIC DIAGRAM


AF ASSEMBLY GWK-271
Q101 ~ 106, 123: MUTING
IC101 ~ 102: INPUT / REC OUT SWITCHING
IC103: BUFFER AMP
CONTROL ASSEMBLY GWG-203 CN103
CONTROL ASSEMBLY GWG-203 CN 101
IC701: FLAT AMP
Q121, 122, IC106-1/2: L+R/L-R MIXER
IC106-2/2: LPF
IC551: DOLBY NR DECODER
IC552-1/2: MIXER
IC552-2/2: FLAT AMP
SORROUND CONTROL ASSEMBLY GWG-204
PIN JACK ASSEMBLY
Q119, 120: POWER ON/OFF MUTING
Q806, 807, 810: MUTING TRANSISTOR DRIVE
Q201 ~ 206, Q5: REGULATOR
Q801, 803, IC803: WIRELESS/WIRED DATA SWITCHING
IC302: INVERTER
Q804, 805: POWER RELAY DRIVER
POWER TRANSFORMER T201
POWER TRANSFORMER T1
TRANSISTOR ASSEMBLY 2SC2603
Q213: MUTING CONTROL SIGNAL VOLTAGE SHIFTER
IC101, 102, 108 TC4066BP
IC103, 106, 552, 701 M5218PF
IC107 NE571
IC201 μPC78M05H
IC551 LA2730
IC802, 804 TC4069UBP
IC803 μPD4011BC
Q1, 2 2SC2579
Q3, 4 2SA1104
Q5 2SC2577
D101 ~ 106, 205, 206, 207, D213, 215 ~ 220, 224, 226, 227 D803 ~ 807, 810 1SS131
D111, 112 RD2.7EB
D113 ~ 116 KZL056
D201 ~ 204, 209, 210, 222, 808 11E2
D225 KZL061
Q101 ~ 106, 121 2SC
Q107 ~ 110, 21 2SA
Q111, 112, 207, 2SC
Q113, 114 2SC
Q115, 116 2SA
Q119, 120, 203 2SA
Q201, 209, 21 2SA
Q202 2SB
Q205, 211, 8 2SB
Q206 2SB
Q801 RN
Q803, 804, 8 RN
D208 4
D211, 212, R
D214, 229 R
D228 R
D809 F
Q107 ~ 118, Q1 ~ 4: P
Q207 ~ 211: PROTEC
"SB" at +7.5V Others -7.5V
"EX" at +7.5V Others -7.5V
"SS" at +7.5V ("SS") Others 0V ("SS")
"DOL" at -7.5V Others +7.5V
"DOL" at +7.5V Others -7.5V
"ST" at +7.5V Others -7.5V
"ST" at -7.5V Others +7.5V
"TAPE" TAPE +7.5V TAPE -7.5V
S801: CONTROL SELECT
AC POWER CORD ADG-089
POWER ASG-549
C1: ACG-502
SWITCHED OUTLET 280W MAX
AKP-507
C205, C207 ~ C210: ACG-913
C223, C224: ACG-902
REMOTE CONTROL SENSOR UNIT (AAH3003)

NOTE:
The indicated semiconductors are representative ones only. Other alternative semiconductors may be used and are listed in the parts list.



1. RESISTORS:
Indicated in Ω, ¼W, ½W: ±5% tolerance unless otherwise noted k: kΩ, M: MΩ, (F): ±1%, (G): ±2%, (K): ±10% (M): ±20% tolerance

2. CAPACITORS:
Indicated in capacity (μF)/voltage (V) unless otherwise noted p: pF
Indication without voltage is 50V except electrolytic capacitor.

3. VOLTAGE, CURRENT:
: Signal voltage at (W+ W 8Ω)output (1kHz)
: DC voltage (V) at no input signal
Value in ( ) is DC voltage at rated power.
⇦mA: DC current at no input signal

4. OTHERS:
➡: Signal route.
⊘: Adjusting point.
The ⚠ mark found on some component parts indicates the importance of the safety factor of the part. Therefore, when replacing, be sure to use parts of identical designation.
※ marked capacitors and resistors have parts numbers.

This is the basic schematic diagram, but the actual circuit may vary due to improvements in design.

SWITCHES:

PIN JACK ASSEMBLY
S801 : REMOTE ON — OFF

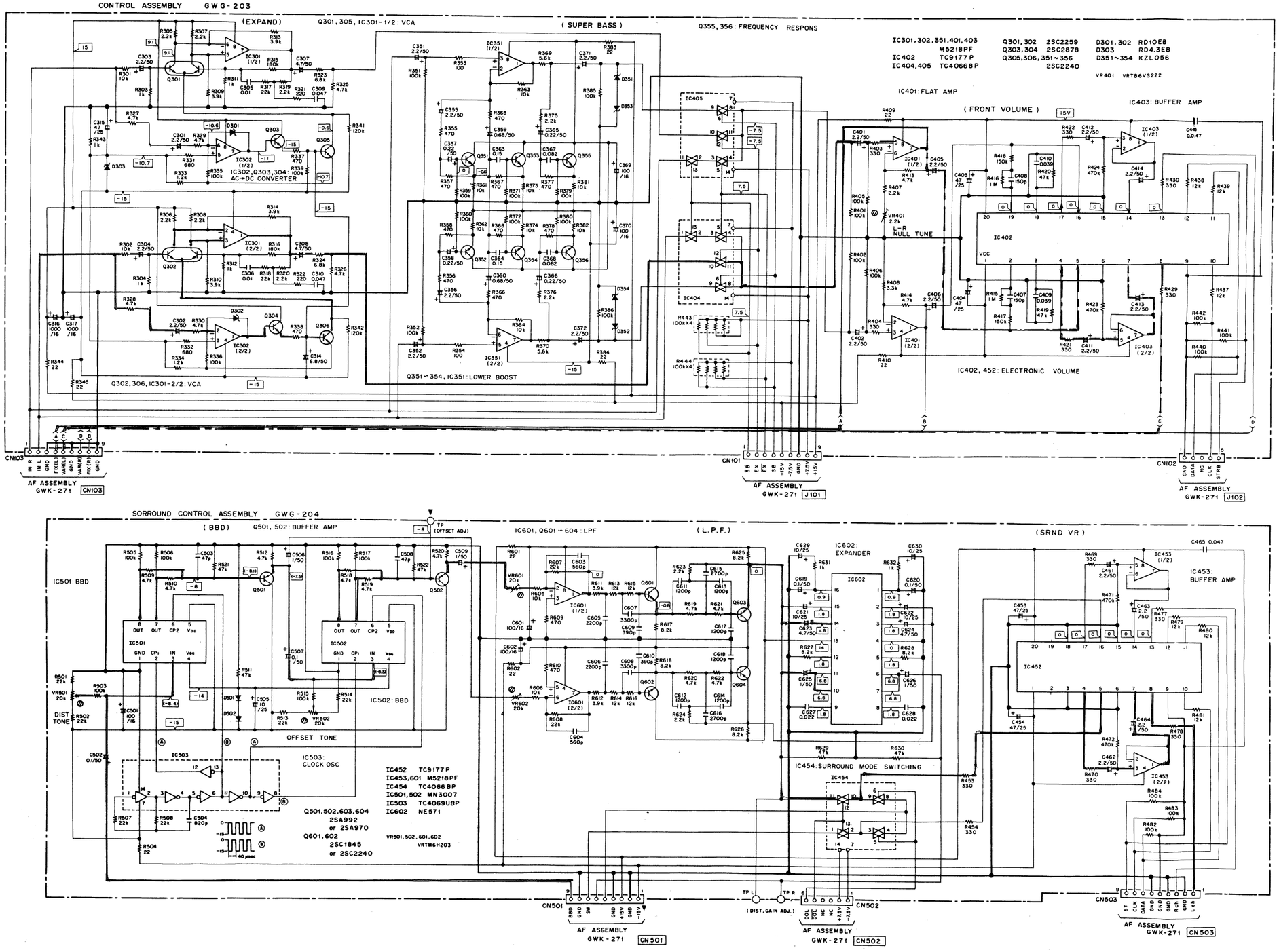
POWER SW ASSEMBLY
S901 : TAPE MONITOR (A1, D0) ON — OFF
S902 : POWER (A1, D1) ON — OFF

VR SW ASSEMBLY
S903 : DN (A2, D0) ON — OFF
S904 : MUTING (A0, D1) ON — OFF
S905 : UP (A2, D1) ON — OFF

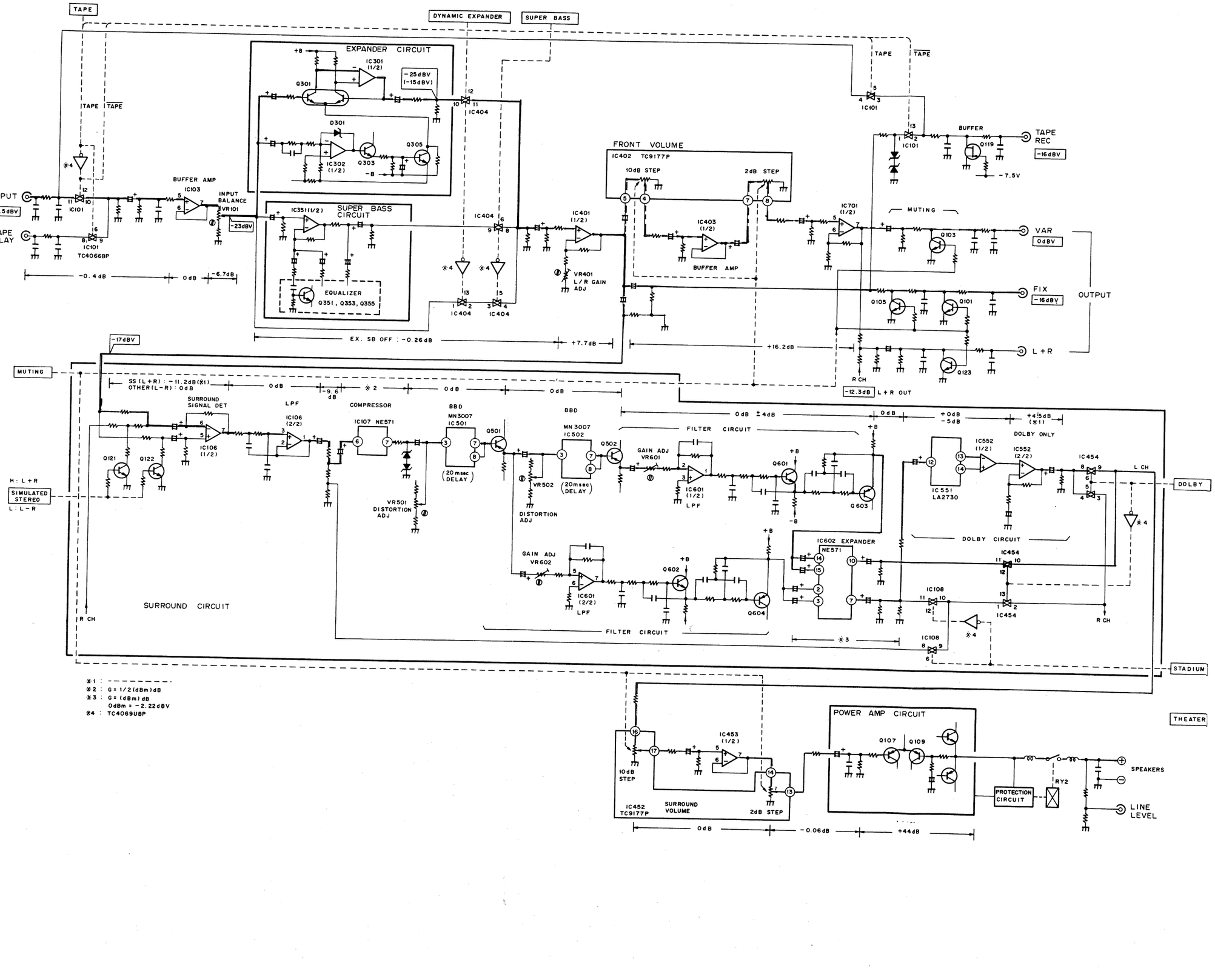
OTHERS
S1 : POWER ON — OFF

The underlined indicates the switch position.

SIGNAL RUTE: THEATER SWITCH ON-OFF
EXPAND SWITCH ON-OFF


CONTROL ASSEMBLY GWG-203
(EXPAND)
Q301,305, IC301-1/2: VCA
(SUPER BASS)
Q355,356: FREQUENCY RESPONS
IC302,Q303,304: AC→DC CONVERTER
Q302,306, IC301-2/2: VCA
Q351~354, IC351: LOWER BOOST
IC401: FLAT AMP
(FRONT VOLUME)
IC403: BUFFER AMP
L-R NULL TUNE
IC402, 452: ELECTRONIC VOLUME
IC401,302,351,401,403 M5218PF
IC402 TC9177P
IC404,405 TC4066BP
Q301,302 2SC2259
Q303,304 2SC2878
Q305,306,351~356 2SC2240
D301,302 RD10EB
D303 RD4.3EB
D351~354 KZL056
VR401 VRT86VS222
CN103
AF ASSEMBLY GWK-271 CN103
CN101
AF ASSEMBLY GWK-271 J101
CN102
AF ASSEMBLY GWK-271 J102
SORROUND CONTROL ASSEMBLY GWG-204
(BBD)
Q501, 502: BUFFER AMP
IC601, Q601~604: LPF
(L.P.F.)
IC602: EXPANDER
(SRND VR)
IC453: BUFFER AMP
IC501: BBD
IC502: BBD
OFFSET TONE
IC503: CLOCK OSC
IC454: SURROUND MODE SWITCHING
IC452 TC9177P
IC453,601 M5218PF
IC454 TC4066BP
IC501,502 MN3007
IC503 TC4069UBP
IC602 NE571
Q501,502,603,604 2SA992 or 2SA970
Q601,602 2SC1845 or 2SC2240
VR501,502,601,602 VRTM6H203
CN501
AF ASSEMBLY GWK-271 CN501
CN502
AF ASSEMBLY GWK-271 CN502
CN503
AF ASSEMBLY GWK-271 CN503

7. BLOCK DIAGRAM



8. ELECTRICAL PARTS LIST

NOTES:

- *When ordering resistors, first convert resistance values into code form as shown in the following examples.*
  Ex. 1 *When there are 2 effective digits (any digit apart from 0), such as 560 ohm and 47k ohm (tolerance is shown by J=5%, and K=10%).*

560Ω	*56 × 10¹*	*561*	*RD¼PS 5 6 1 J*
47kΩ	*47 × 10³*	*473*	*RD¼PS 4 7 3 J*
0.5Ω	*0R5*		*RN2H 0 R 5 K*
1Ω	*010*		*RS1P 0 1 0 K*

  Ex. 2 *When there are 3 effective digits (such as in high precision metal film resistors).*

5.62kΩ	*562 × 10¹*	*5621*	*RN¼SR 5 6 2 1 F*

- *The ⚠ mark found on some component parts indicates the importance of the safety factor of the part. Therefore, when replacing, be sure to use parts of identical designation.*
- *For your Parts Stock Control, the fast moving items are indicated with the marks ★★ and ★.*
  ★★ GENERALLY MOVES FASTER THAN ★
  This classification shall be adjusted by each distributor because it depends on model number, temperature, humidity, etc.
- *Parts marked by " ⊙ " are not always kept in stock. Their delivery time may be longer than usual or they may be unavailable.*

Miscellaneous Parts

P.C. BOARD ASSEMBLIES

Mark	Symbol & Description	Part No.
	AF Assembly	GWK-271
	Control assembly	GWG-203
	Surround control assembly	GWG-204
	Micro computer assembly	GWP-161
	Pin jack assembly	Non supply
	Transistor assembly	Non supply
	Power SW assembly	Non supply
	LED Assembly	Non supply
	VR SW Assembly	Non supply

SEMICONDUCTORS

Mark	Symbol & Description	Part No.
★★	Q2, Q4	2SA1104(A)
★★	Q5	2SC2577(A)
★★	Q1, Q3	2SC2579(A)

SWITCH

Mark	Symbol & Description		Part No.
⚠ ★★	S1	Push switch (POWER)	ASG-549

TRANSFORMER

Mark	Symbol & Description		Part No.
⚠ ★	T1	Power transformer (AC 120V)	ATS-288

CAPACITOR

Mark	Symbol & Description		Part No.
⚠	C1	(0.01μF/125V)	ACG-502

OTHERS

Mark	Symbol & Description		Part No.
⚠ ★★	FU1	Fuse (3.15A)	AEK-124
⚠ ★★	FU2	Fuse (500mA)	AEK-136
		Remote control sensor unit	AXX1003
⚠		AC Power cord	ADG-089
⚠		AC Socket (1P, AC OUTLET)	AKP-507
		Remote control unit	AXD-016

AF Assembly (GWK-271)

SEMICONDUCTORS

Mark	Symbol & Description	Part No.
★★	IC551	LA2730
★★	IC103, IC106, IC552, IC701	M5218PF
★★	IC107	NE571
★★	IC101, IC102, IC108	TC4066BP
★★	IC802, IC804	TC4069UBP
★★	IC201	UPC78M05H
★★	IC803	UPD4011BC
★★	Q803, Q804, Q806, Q807	RN1203
★★	Q801	RN2203
★★	Q115, Q116	2SA965(A)
★★	Q107–Q110, Q213	2SA992
★★	Q206	2SB560
★★	Q202	2SB834
★★	Q113, Q114	2SC2235(A)
★★	Q111, Q112, Q207, Q208	2SC2240
★★	Q201, Q209, Q210	2SC2603
★★	Q101–Q106, Q121–Q123	2SC2878
★★	Q205, Q211, Q805	2SD438
★★	Q119, Q120, Q203, Q204, Q810	2SK246-Y
★	D809	RD10EB
★	D228	RD15EB
★	D211, D212, D221	RD16EB
★	D111, D112	RD2.7EB
★	D214, D229	RD8.2EB

Mark	Symbol & Description	Part No.
★	D101–D106, D205–D207, C213, D215–D220, D224, D226, D227, D803–D807, D810	1SS131
★	D225	KZL061
★	D201–D204, D209, C210, D222, D808	11E2
★	D208	4D4B42
★	D113–D116	KZL056
★	D225	KZL061

RELAIES

Mark	Symbol & Description	Part No.
★★	RY2 Relay (PROTECTION)	ASR-111
⚠ ★★	RY1 Relay (POWER)	ASR-512

COILS, TRANSFORMER

Mark	Symbol & Description	Part No.
	L103–L106 AF Chock coil	ATH-053
	L101, L102 AF Chock coil	ATH-059
⚠ ★	T201 Power transformer	ATS-289

CAPACITORS

Mark	Symbol & Description	Part No.
⚠	C223, C224 Ceramic capacitor (0.01μF/125V)	ACG-502
	C205, C207–C210 Ceramic capacitor (0.01μF/150V)	ACG-019
	C211, C212 Electrolytic capacitor (3300μF/42V)	ACH-249
	C101–C106, C163–C168	CCCSL101J50
	C139–C142	CCCSL101K500
	C135, C136	CCCSL220K500
	C123–C128	CCCSL470J50
	C143, C144	CEANPR47M50
	C115, C551	CEASR33M50
	C147	CEASR47M50
	C117, C202, C203	CEAS0R1M50
	C107, C108, C116, C177, C178, C180, C183, C184, C553, C558, C559, C562, C563, C565, C701, C702	CEAS010M50
	C118, C120, C179, C801, C804	CEAS100M25
	C564	CEAS101M16
	C137, C138, C146, C556	CEAS101M25
	C131, C132	CEAS101M50
	C204	CEAS102M25
	C222	CEAS102M50
	C129, C130, C555, C181, C182	CEAS220M25
	C133, C134	CEAS221M10
	C109–C112, C119	CEAS4R7M50
	C703–C705	
	C201	CEAS470M10
	C213–C216	CEAS470M16
	C217–C220	CEAS470M25
	C221	CEAS470M50
	C145	CEAS471M6
	C802	CKCYB222K50
	C153–C162	CKCYB331K50
	C113	CKCYB332K50
	C557	CKCYB471K50
	C303	CKCYB472K50
	C114	CKCYB821K50
	C148	CKCYF473Z50
	C552	CQMA104K50
	C121	CQMA223K50
	C554, C560	CQMA333K50
	C561	CQMA472K50
	C225, C226	CQMA473K50
	C149–C152, C171–C174	CQMA823K50

RESISTORS

Note: When ordering resistors, convert the resistance value into code form, and then rewrite the part no. as before.

Mark	Symbol & Description	Part No.
★	VR101 Variable resistor (5kΩx2) (BALANCE)	ACT-705
	R191, R192 Wire wound resistor (0.22Ωx2)	ACN-131
	R223–R226, R232, R233	RD1/4PMFL□□□J
	R175–R178	RD1/4PM□□□J
	R165, R166, R179–R190, R193, R194, R201, R202, R205, R207, R208, R217, R236, R564	RFA1/4PS□□□J
	R237, R809	RS2LMF□□□J
	R209, R220	RS1PMF□□□J
	Other resistors	RD1/8PM□□□J

OTHERS

Mark	Symbol & Description	Part No.
	Terminal 6P (INPUT, OUTPUT FLX/VAR)	AKB-095
	Terminal 4P (SPEAKER)	AKE-109
	Transistor socket	AKH-017

Control Assembly (GWG-203)

SEMICONDUCTORS

Mark	Symbol & Description	Part No.
★★	IC301, IC302, IC351, IC401, IC403	M5218PF
★★	IC404, IC405	TC4066BP
★★	IC402	TC9177P
★★	Q305, Q306, Q351–Q356	2SC2240
★★	Q301, Q302	2SC2259
★★	Q303, Q304	2SC2878
★	D351–D354	KZL056
★	D301, D302	RD10EB
★	D303	RD4.3EB

CAPACITORS

Mark	Symbol & Description	Part No.
	C407, C408	CCCSL151J50
	C357, C358, C365, C366	CEASR22M50
	C359, C360	CEASR68M50
	C369, C370	CEAS101M16
	C316, C317	CEAS102M16
	C301–C304, C351, C352, C355, C356, C371, C372, C401, C402, C405, C406, C411–C414	CEAS2R2M50
	C307, C308	CEAS4R7M50
	C315, C403, C404	CEAS470M25
	C314	CEAS6R8M50
	C305, C306	CKCYB103K50
	C309, C310	CKCYX473M25
	C363, C364	CQMA154K50
	C409, C410	CQMA393K50
	C367, C368	CQMA823K50
	C415	CKDYF473Z50

RESISTORS

Note: When ordering resistors, convert the resistance value into code form, and then rewrite the part no. as before.

Mark	Symbol & Description	Part No.
★	VR401 Semi-fixed (2.2k)	VRTB6VS222
	R344, R345, R383, R384, R409, R410	RFA1/4PS220J
	R443, R444	RA4S104J
	Other resistors	RD1/8PM□□□J

Surround Control Assembly (GWG-204)

SEMICONDUCTORS

Mark	Symbol & Description	Part No.
★★	IC501, IC502	MN3007
★★	IC453, IC601	M5218PF
★★	IC602	NE571
★★	IC454	TC4066BP
★★	IC503	TC4069UBP
★★	IC452	TC9177P
★★	Q501, Q502, Q603, Q604	2SA992 (2SA970)
★★	Q601, Q602	2SC1845 (2SC2240)
★	D501, D502	1SS131

CAPACITORS

Mark	Symbol & Description	Part No.
	C503, C508	CCCSL470J50
	C502, C507, C619, C620	CEAS0R1M50
	C506, C509, C625, C626	CEAS010M50
	C505, C621, C622, C629, C630	CEAS100M25
	C501, C601, C602	CEAS101M16
	C461–C464	CEAS2R2M50
	C623, C624	CEAS4R7M50
	C453, C454	CEAS470M25
	C611–C614, C617, C618	CKCYB122K50
	C605, C606	CKCYB222K50
	C615, C616	CKCYB272K50
	C607, C608	CKCYB332K50
	C609, C610	CKCYB391K50
	C603, C604	CKCYB561K50
	C504	CKDYB821K50
	C627, C628	CQMA223K50
	C465	CKDYF473Z50

RESISTORS

Note: When ordering resistors, convert the resistance value into code form, and then rewrite the part no. as before.

Mark	Symbol & Description	Part No.
★	VR501, VR502, VR601, VR602 Semi-fixed (20k)	VRTM6H203
	R459, R460, R504, R601, R602	RFA1/4PS220J
	Other resistors	RD1/8PM□□□J

Micro Computer Assembly (GWP-161)

SEMICONDUCTORS

Mark	Symbol & Description	Part No.
★★	IC901	PDE009
★★	IC902	TD62504P
★★	IC903	M54560P
★★	IC904	PD0012A
★★	Q901–Q903	2SA933S (2SA1115)
★★	Q904, Q908	RN1203 (2SC3400)
★★	Q912, Q913	2SB560
★	D901–D905, D927, D928	1SS131
★	D907 LED (MUTING)	AEL1002
★	D908,D911, D913, D915 LED (LOUDNESS, THEATER, STADIUM, SIMULATED STEREO)	AEL-463
★	D909,D910 LED (SUPER BASS, DYNAMIC EXPANDER)	AEL-460
★	D917 LED (DOLBY)	AEL1003
★	D918–D922 LED (VOLUME)	AEL1001

CAPACITORS

Mark	Symbol & Description	Part No.
	C901 Super capacitor (0.047F)	ACH-902
	C902	CEAS471M6
	C903, C905	CEAS2R2M50
	C904	CEAS221M10
	C906	CEAS010M50
	C907, C908	CCCSL121J50
	C909	CCCSL101J50

RESISTORS

Note: When ordering resistors, convert the resistance value into code form, and then rewrite the part no. as before.

Mark	Symbol & Description	Part No.
	R935	RD1/4PM181J
	R942	RS1PMF821J
	Other resistors	RD1/8PM□□□J

OTHERS

Mark	Symbol & Description	Part No.
★	X901 Ceramic resonator	ASS-039

Pin Jack Assembly

SWITCH

Mark	Symbol & Description	Part No.
★★	S801 Slide switch (CONTROL UNIT SELECTOR)	ASH-031

CAPACITORS

Mark	Symbol & Description	Part No.
	C176	CCCSL101J50
	C175	CKCYB331K50

RESISTOR

Mark	Symbol & Description	Part No.
	R126	RD1/8PM101J

OTHERS

Mark	Symbol & Description	Part No.
	Terminal 1P (OUTPUT L+R)	AKB-097
	Mini terminal 2P (CONTROL OUT/IN)	AKN-209

Transistor Assembly

Mark	Symbol & Description	Part No.
★★	Q117, Q118	2SC2603

Power Switch Assembly

SEMICONDUCTORS

Mark	Symbol & Description	Part No.
★★	Q914	2SC1740S (2SC2603)
★	D924 LED (STAND-BY)	AEL1003
★	D925 LED (POWER)	AEL-463
★	D926 LED (TAPE MONITOR)	AEL-460

SWITCHES

Mark	Symbol & Description	Part No.
★★	S901, S902 Tact switch (POWER, TAPE MONITOR)	ASG-711

RESISTORS

Mark	Symbol & Description	Part No.
	R941	RD1/8PM561J

LED Assembly

SEMICONDUCTORS

Mark	Symbol & Description	Part No.
★★	Q907	RN1203 (2SC3400)
★	D906 LED	AEL-443

RESISTORS

Note: When ordering resistors, convert the resistance value into code form, and then rewrite the part no. as before.

Mark	Symbol & Description	Part No.
	R918	RD1/8PM331J

VR, Switch Assembly

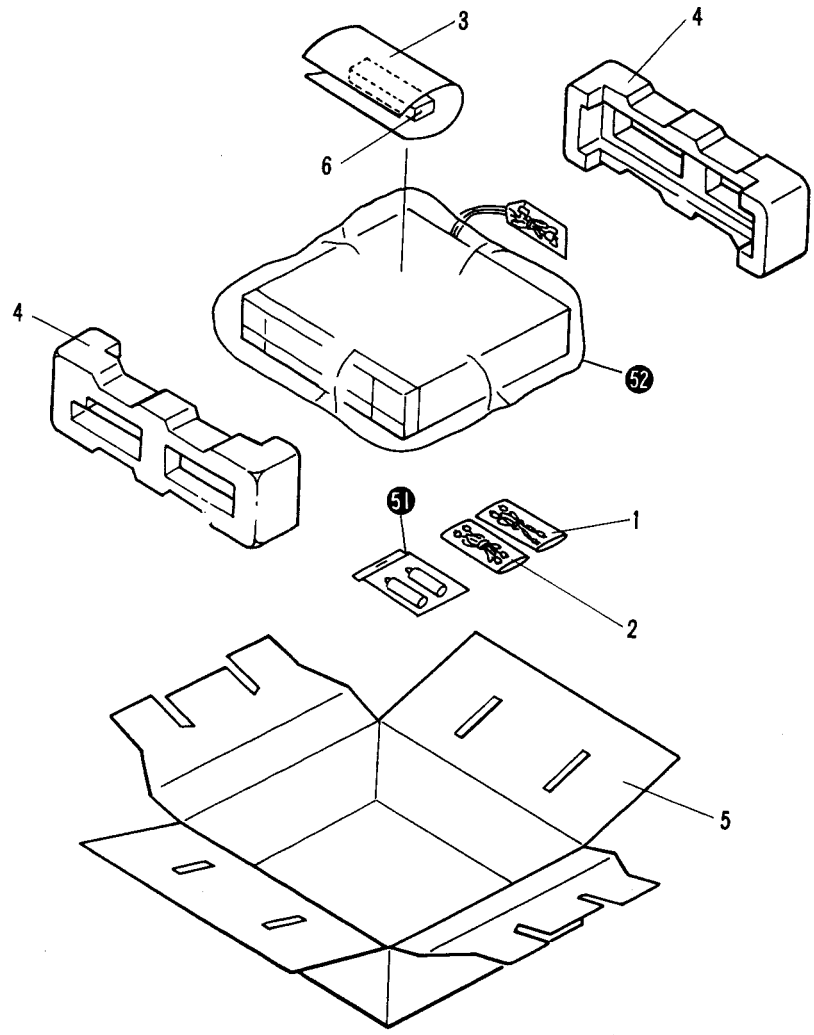
RELAYS

Mark	Symbol & Description	Part No.
★★	S903–S905 Tact switch (VOLUME UP, DOWN, MUTING)	ASG-711

9. PACKING

Parts List

Mark	No.	Part No.	Description
	1	ADE-110	Connection cord with plug
	2	ADE-111	Connection cord with plug
	3	ARB-723	Operating instructions
	4	AHA-419	Front rear pad
	5	AHE-696	Packing case
	6	AXD-016	Remote control unit
	51		Battery assembly
	52		Polyetheren sheet



10. ADJUSTMENTS

Measurement Instruments used: Millivoltmeter, low frequency oscillator.

		Input			Output		Adjustment Values
		Input Terminal	Frequency	Level	Measurement Location	Adjustment Location	
1. NUL ADJUSTMENT							
1.	Turn the power switch on. Set the Input balance volume to center click position.						
2.	Set the mode to THEATER by the remote control unit.						
3.	Turn the MUTING, LOUDNESS, SUPER BASS, and DYNAMIC EXPANDER switches off.						
4.	Turn the MASTER volume to MIN.						
5.	Turn the SURROUND volume to MIN.						
6.	Adjustment.	L and R of INPUT (Monaural).	1kHz (SINE WAVE).	1V	TP terminal R.	VR401	Adjust the output MIN.
2. DISTORTION ADJUSTMENT							
1.	Set the main unit by following the steps from 1 to 3 of item 1. above.						
2.	Turn the MASTER volume to MIN (SURROUND volume automatically turns to MIN.)						
3.	Adjustment.	Only L of INPUT.	1kHz (SINE WAVE).	1V	TP terminal R *	VR501	Turn distortion to MIN.
3. OFFSET ADJUSTMENT							
1.	Set the main unit by following the steps from 1 to 3 of item 2. above.						
2.	Adjustment.	–	–	Silent (No Signal).	Between the base side of Q502 and earth.	VR502	Adjust to DC –8V.
4. GAIN ADJUSTMENT							
1.	Set the main unit by following the steps from 1 to 3 of item 1. above.						
2.	Turn the MASTER volume to MIN (SURROUND volume automatically turns to MIN.)						
3.	Adjustment.	Only L of INPUT.	1kHz (SINE WAVE).	1V	IC552 No. 1 PIN ** (AF ASSEMBLY).	VR602	Adjust to 357mV.
					TP terminal L *	VR601	Adjust to 528mV.
5. GAIN VERIFICATION							
1.	Set the main unit by following the steps from 1 to 2 of item 4. above.						
2.	Verification	L or R of INPUT.	1kHz (SINE WAVE).	1V	TP terminal R *	–	Within 333mV±30mV.

* Surround Control Assembly (GWG-204).
** DOLBY TP.

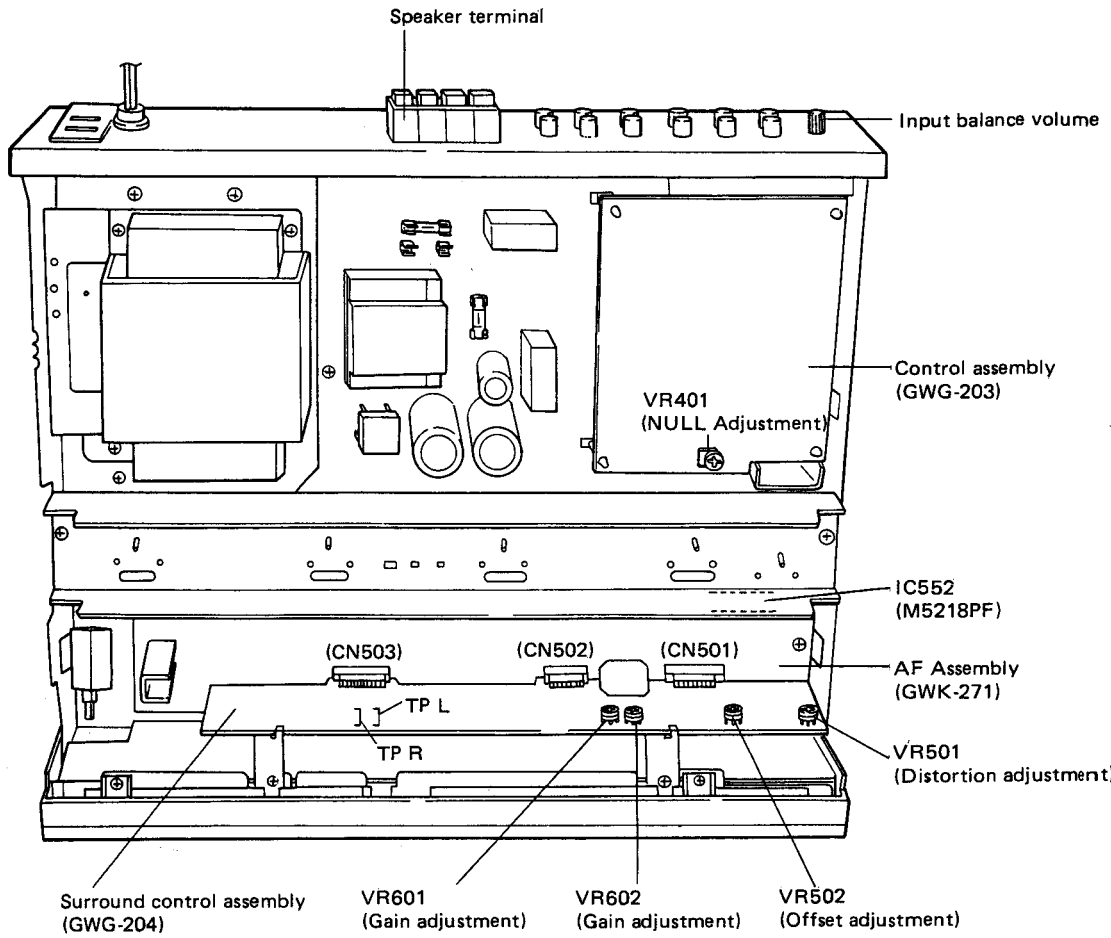


Fig. 10-1 Arrangement diagram of adjusting parts

10. RÉGLAGES

Instruments de mesure utilisés: Millivoltmètre oscillateur de basse fréquence.

		Entrée			Sortie		Valeurs relevées
		Borne d'entrée	Fréquence	Niveau	Emplacement de la borne de mesure	Emplacement du réglage	
1. RÉGLAGE NUL							
1.	Mettre l'interrupteur d'alimentation à la position ON. (Régler la commande d'équilibre d'entrée à la position centrale "déclic".)						
2.	Placer le mode à la position THEATER à l'aide de la télécommande.						
3.	Mettre les commutateurs (MUTING), (LOUDNESS), (SUPER BASS), (DYNAMIC) et (EXPANDER) à la position OFF.						
4.	Mettre la commande de volume principal (MASTER) à la position MIN.						
5.	Mettre la commande de volume d'ambiance (SURROUND) à la position MIN.						
6.	Réglage	Gauche (L) et Droite (R) d'ENTREE (INPUT) (monaural).	1kHz (SINE WAVE).	1V	Borne droite de TP.	VR401	Régler le niveau de sortie à MIN.
2. RÉGLAGE DE DISTORSION							
1.	Régler l'unité principale en suivant les étapes de 1 à 3 de l'article 1 ci-dessus.						
2.	Mettre la commande de volume principal (MASTER) à la position MIN (le volume d'ambiance (SURROUND) se met automatiquement à la position MIN.)						
3.	Réglage	Uniquement gauche (L) d'ENTREE (INPUT).	1kHz (SINE WAVE).	1V	Borne droite de TP. *	VR501	Mettre Distorsion à MIN.
3. RÉGLAGE DE DECALAGE							
1.	Régler l'unité principale en suivant les étapes de 1 à 3 de l'article 2 ci-dessus.						
2.	Réglage	–	–	Silence (PAS DE SIGNAL).	Entre le côté de la base de Q502 et la terre.	VR502	Régler à CC –8V.
4. RÉGLAGE DE GAIN							
1.	Régler l'unité principale en suivant les étapes de 1 à 3 de l'article 1 ci-dessus.						
2.	Mettre le commande de volume principal (MASTER) à la position MIN (le volume d'ambiance (SURROUND) se met automatiquement à la position MIN.)						
3.	Réglage	Uniquement gauche (L) d'ENTREE (INPUT).	1kHz (SINE WAVE).	1V	Broche N° 1 IC552 ** (ENS. AF).	VR602	Régler à 357mV.
					Borne gauche de TP. *	VR601	Régler à 528mV.
5. VÉRIFICATION DE GAIN							
1.	Régler l'unité principale en suivant les étapes de 1 à 3 de l'article 4 ci-dessus.						
2.	Vérification	Gauche (L) ou droite (R) d'ENTREE (INPUT).	1kHz (SINE WAVE).	1V	Borne droite de TP. *	–	Moins de 333mV±30mV.

* Ensemble de contrôle d'ambiance (SURROUND) (GWG-204)
** Dolby TP.

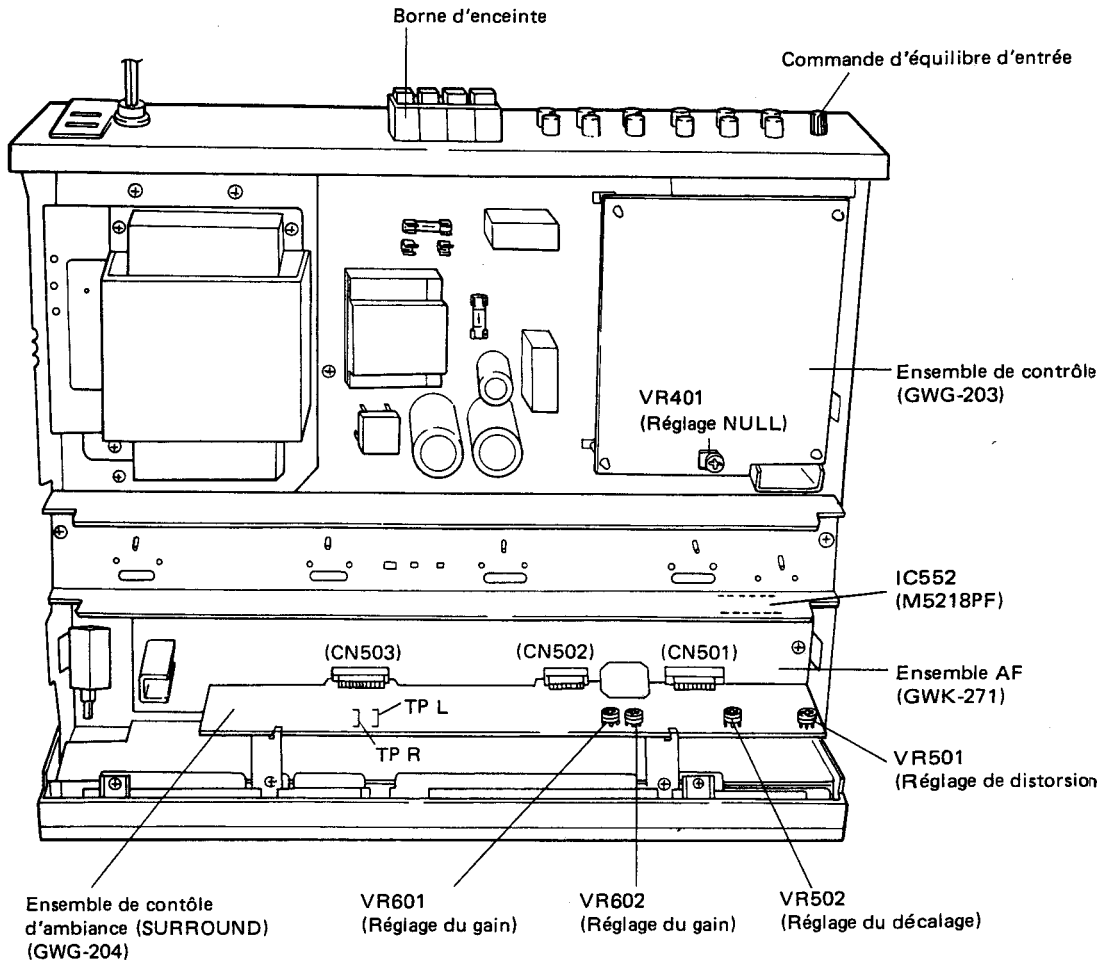


Fig. 10-1 Diagramme de disposition des plèces de réglage

10. AJUSTE

Instrumentos de medición utilizados: Milivoltímetro oscilador de bajas frecuencias.

		Entrada			Salida		Valores de ajuste
		Terminal de entrada	Frecuencia	Nivel	Lugar de medicion	Lugar de ajuste	
1. AJUSTE NULO							
1.	Ponga el interruptor de alimentación en la posición ON. (Ajuste el control de balance en la posición central con detención.)						
2.	Ajuste el modo a THEATER mediante el controlador remoto.						
3.	Desconecte los interruptores MUTING, LOUDNESS, SUPER BASS, DYNAMIC y EXPANDER.						
4.	Gire el control MASTER a la posición MIN.						
5.	Gire el control SURROUND a la posición MIN.						
6.	Ajuste.	Izq. (L) y Der. (R) de entrada (INPUT) (monaural).	1kHz (ONDA SINUSOIDAL).	1V	Terminal Dor. (R) TP.	VR401	Ajuste la salida a MIN.
2. AJUSTE DE LA DISTORSION							
1.	Ajuste la unidad principal siguiendo los pasos 1 al 3 del ítem 1 de arriba.						
2.	Ponga el control MASTER en la posición MIN (el control SURROUND se pone automáticamente a MIN.)						
3.	Ajuste	Sólo Izq. (L) de entrada (INPUT).	1kHz (ONDA SINUSOIDAL).	1V	Terminal Der. (R) TP. *	VR501	Gire el control de Distortion a la posición MIN.
3. AJUSTE DEL DESCENTRAMIENTO							
1.	Ajuste la unidad principal siguiendo los pasos 1 al 3 del ítem 2 de arriba.						
2.	Ajuste	–	–	Silencio (SIN SEÑAL).	Entre el lado de base de Q502 y masa.	VR502	Ajuste a –8V CC.
4. AJUSTE DE LA GANANCIA							
1.	Ajuste la unidad principal siguiendo los pasos 1 al 3 del ítem 1 de arriba.						
2.	Ponga el control MASTER en la posición MIN (el control SURROUND se pone automáticamente a MIN.)						
3.	Ajuste	Sólo Izq. (L) de entrada (INPUT).	1kHz (ONDA SINUSOIDAL).	1V	Patilla N°1 de IC552** (CONJUNTO AF).	VR602	Ajuste a 357mV.
					Terminal Izq. (L) TP. *	VR601	Ajuste a 528mV.
5. VERIFICACION DE LA GANANCIA							
1.	Ajuste la unidad principal siguiendo los pasos 1 al 2 del ítem 4 de abbiba.						
2.	Verificacion	Izq. (L) o Der. (R) entrada (INPUT).	1kHz (ONDA SINUSOIDAL).	1V	Terminal Der. (R) TP. *	–	Dentro de 333mV±30mV.

* Conjunto de control ambiental (SURROUND) (GWG-204).
** Dolby TP.

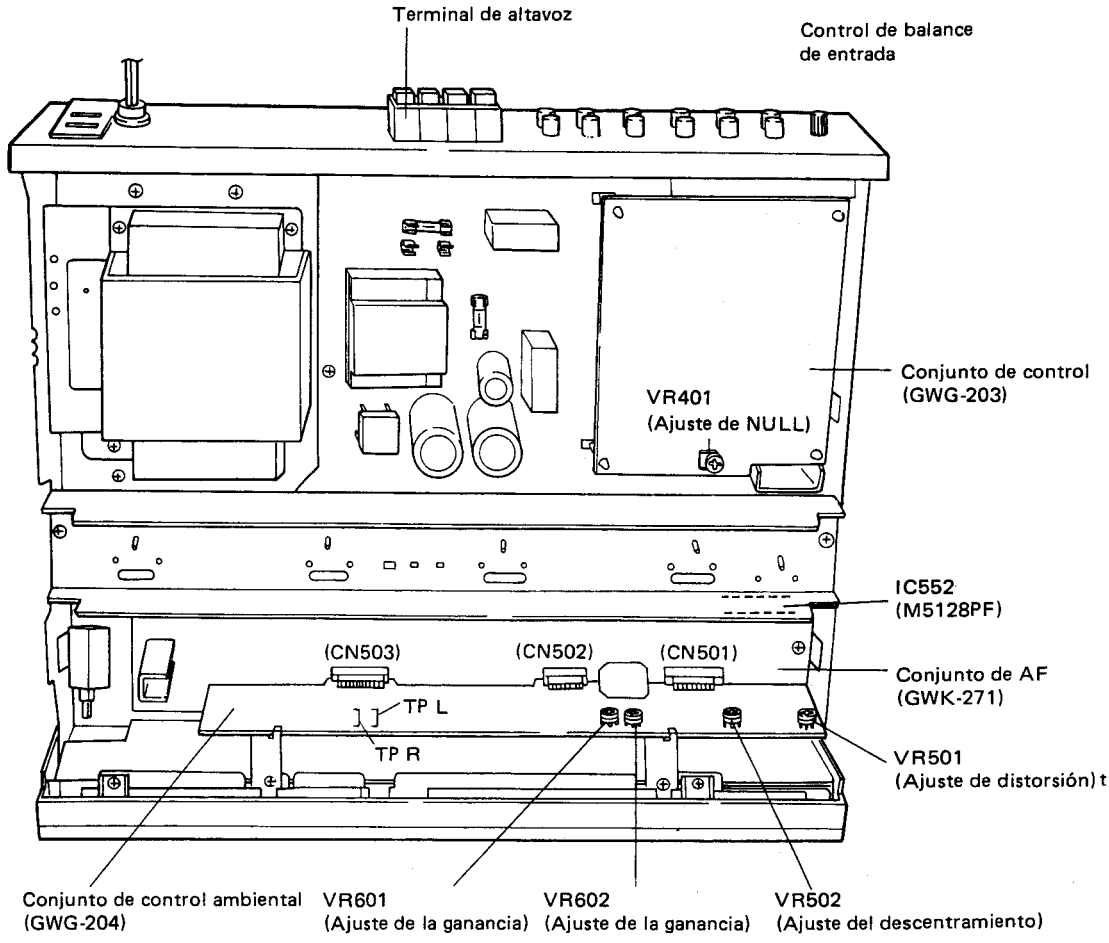
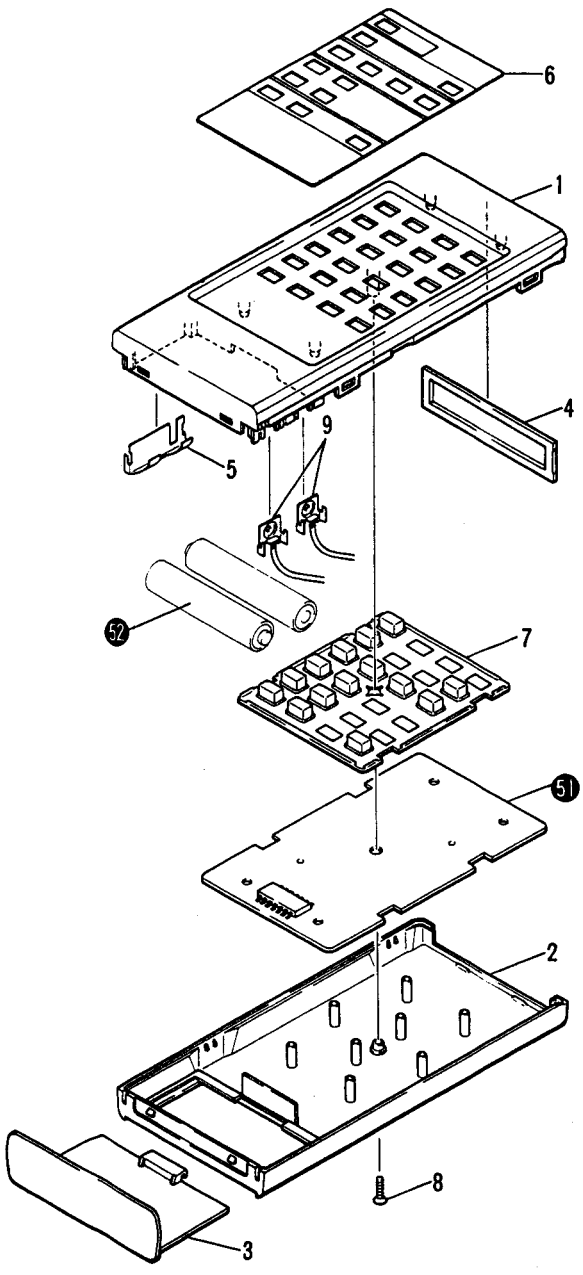


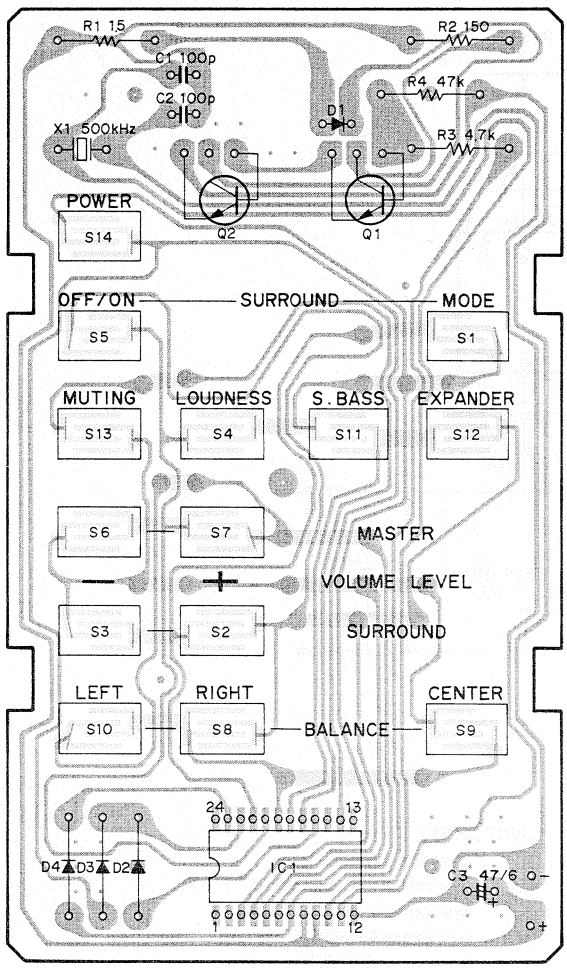
Fig. 10-2 Diagrama de disposición de la partes de ajuste

11. REMOTE CONTROL SECTION/ EXPLODED VIEW AND PARTS LIST



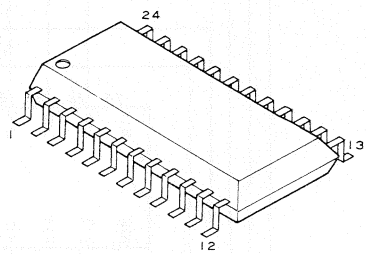
Mark	No.	Part No.	Description
	1	AZN-023	Case (A)
	2	AZN-024	Case (B)
	3	AZN-025	Case (C)
	4	AZN-022	Filter
	5	AZN-026	Terminal
	6	AZA1022	Aluminium plate
	7	AZA1021	Rubber switch
	8	CRZ25P080FZK	Screw
	9		Terminal (A)
	51		P.C. Board assembly
	52		Battery

12. REMOTE CONTROL SECTION / P.C.BOARD PATTERNS

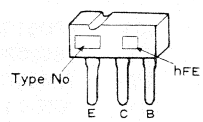


External Appearance of Transistors and ICs

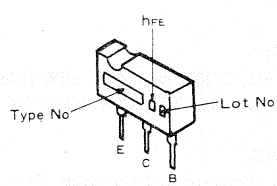
μPD6102G



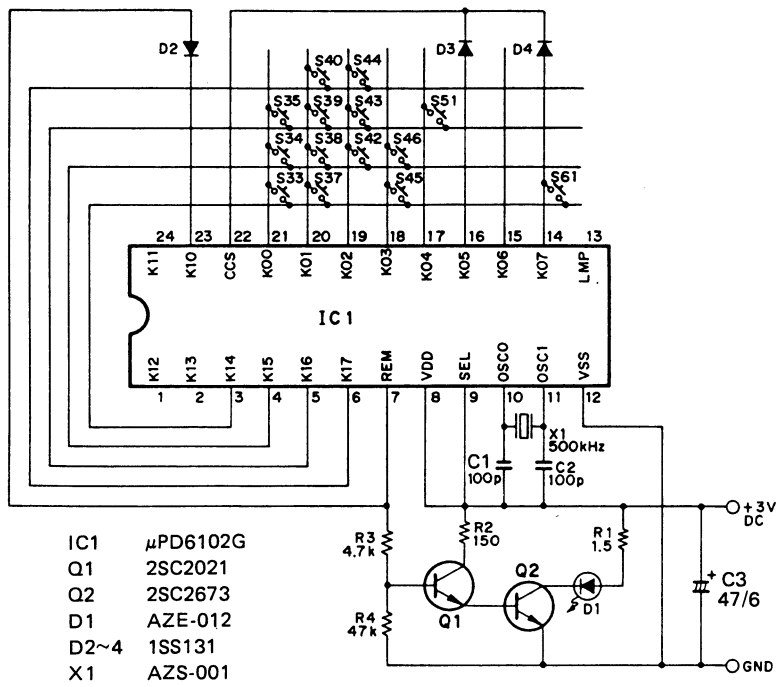
2SC2021



2SC2673



13. REMOTE CONTROL SECTION/SCHEMATIC DIAGRAM



IC1	μPD6102G
Q1	2SC2021
Q2	2SC2673
D1	AZE-012
D2~4	1SS131
X1	AZS-001

1. RESISTORS:
   Indicated in Ω, 1/8W & 1/4W, ±5% tolerance unless otherwise noted k; kΩ, M; MΩ, (F); ±1%, (G); ±2%, (K); ±10%, (M); ±20% tolerance.
2. CAPACITORS:
   Indicated in capacity (μF)/voltage (V) unless otherwise noted p; pF. Indication without voltage is 50V except electrolytic capacitor.
3. VOLTAGE, CURRENT:
   ⏍ ; DC voltage (V) at no input signal
   Value in ( ) is DC voltage at rated power.
   ⇦ mA ; DC current at no input signal
4. OTHERS:
   ⇨ ; Signal route.
   ⊘ ; Adjusting point.
   The ⚠ mark found on some component parts indicates the importance of the safety factor of the part. Therefore, when replacing, be sure to use parts of identical designation.
   * marked capacitors and resistors have parts numbers.
   The underlined indicates the switch position.

SWITCHES:

S_{55}	Surround Mode
S_{34}	Surround Vol. UP (+)
S_{35}	Surround Vol. DOWN (–)
S_{37}	Loudness ON/OFF
S_{33}	Surround ON/OFF
S_{39}	Master Vol. DOWN(–)
S_{49}	Master Vol. UP (+)
S_{42}	Balance Right
S_{43}	Balance Center
S_{44}	Balance Left
S_{45}	Super Bass ON/OFF
S_{46}	Dynamic Exp. ON/OFF
S_{51}	Muting ON/OFF
S_{61}	Power ON/OFF

14. REMOTE CONTROL SECTION/ELECTRICAL PARTS LIST

NOTES:

- *When ordering resistors, first convert resistance values into code form as shown in the following examples.*
  Ex. 1 When there are 2 effective digits (any digit apart from 0), such as 560 ohm and 47k ohm (tolerance is shown by J=5%, and K=10%).

560Ω	*56 × 10¹*	*561*	*RD¼PS [5][6][1] J*
47kΩ	*47 × 10³*	*473*	*RD¼PS [4][7][3] J*
0.5Ω	*0R5*		*RN2H [0][R][5] K*
1Ω	*010*		*RS1P [0][1][0] K*

  Ex. 2 When there are 3 effective digits (such as in high precision metal film resistors).

5.62kΩ	*562 × 10¹*	*5621*	*RN¼SR [5][6][2][1] F*

- *The ⚠ mark found on some component parts indicates the importance of the safety factor of the part. Therefore, when replacing, be sure to use parts of identical designation.*
- *For your Parts Stock Control, the fast moving items are indicated with the marks ★★ and ★.*
  ★★ GENERALLY MOVES FASTER THAN ★
  This classification shall be adjusted by each distributor because it depends on model number, temperature, humidity, etc.
- *Parts marked by " ⊙ " are not always kept in stock. Their delivery time may be longer than usual or they may be unavailable.*

SEMICONDUCTORS

Mark	Symbol & Description	Part No.
★★	IC1	μPD6102G
★★	Q1	2SC2021
★★	Q2	2SC2673
★	D1 LED	AZE-012
★	D2–D4	1SS131

CAPACITORS

Mark	Symbol & Description	Part No.
	C1, C2	CCDCH101J50
	C3	CEAS470M6

RESISTORS

Note: When ordering resistors, convert the resistance value into code form, and then rewrite the part no. as before.

Mark	Symbol & Description	Part No.
	R1–R4	RD1/4PM□□□J

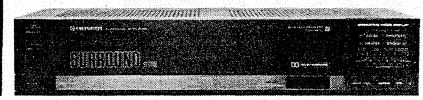
OTHERS

Mark	Symbol & Description	Part No.
★	X1 Ceramic resonator	AZS-001

PIONEER®

Service Manual

CIRCUIT DESCRIPTIONS



ORDER NO.
ARP1016-0

SURROUND AMPLIFIER

SP-X707(BK)

This service manual is applicable to the KU type.

CONTENTS

1. OUTLINE 2
2. SYSTEM BLOCK DIAGRAM AND LEVEL DIAGRAM 4
3. CIRCUIT OUTLINE 7
4. IC DATA 11
5. CONTROL SYSTEM OUTLINE 16

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TEL: (03) 580-9911

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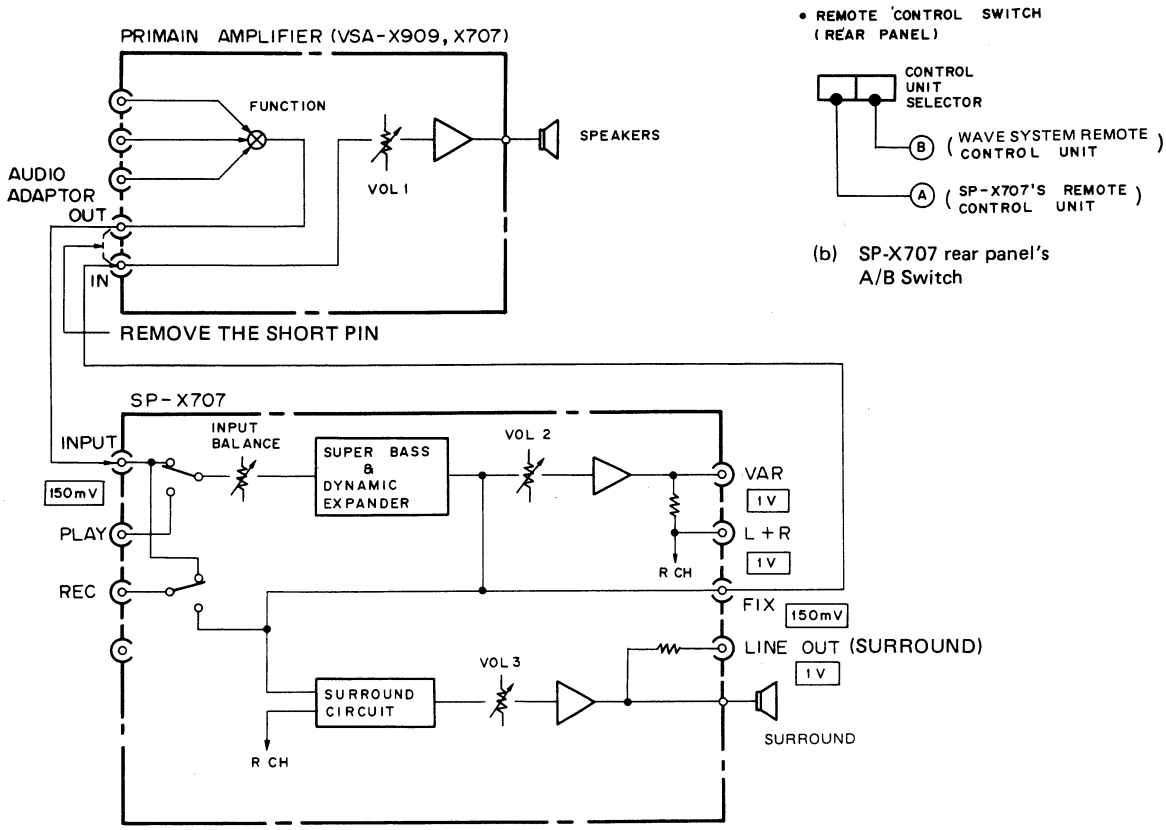
1. OUTLINE

Fig. 1-1 shows how to connect SP-X707 to a primain amplifier.



(b) SP-X707 rear panel's A/B Switch

Fig. 1-1 System block diagram

Operation of Remote Control Unit Key	CU-SPX001 remote control unit accessories to SP-X707.	The CU-AX002 simple remote control unit accessories to the wave system's amplifier or the optional CU-AX001.
	SP-X707	A-X1010V or A-X909V or A-X707V
MASTER VOLUME	VOL 2, VOL 3	VOL 1, VOL 2 VOL 3
SURROUND VOLUME	VOL 3	VOL 3

NOTES: On the Table (How to understand the table).
VOL 1, 2, and 3 shown in Diagram 1-1 (a) can be manipulated by the WAVE SYSTEM amplifier's controlling remote control units once the switch (Diagram 1-1 (b)) on the SP-X707 rear panel is set to the B side.

1.1 VAR TERMINAL

VAR terminal is for connecting amplifiers other than Pioneer's WAVE SYSTEM or other makers' premain amplifiers.

VAR terminal enables overall sound volume control via the SP-X707 remote control. (Fig. 1-1 VOL 2. VOL 3).

1.2 FIX TERMINAL

FIX terminal is for connecting amplifiers when using the WAVE SYSTEM.

The FIX terminal enables adjustment of VOL-1, 2, and 3 shown in Fig. 1-1 (a) via the remote controls (CU-AX002 or CU-AX001) of amplifiers (A-X1010V, A-X909V, A-X707V).

1.3 L+R TERMINAL

The L+R terminal is used with DOLBY SURROUND if the speakers (L, R) are too far apart so as to cause bad sound reception in the area indicated in the diagram.

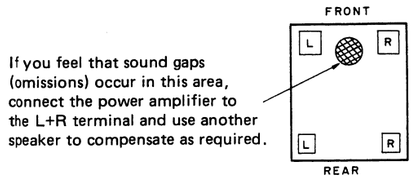

FRONT
L
R
If you feel that sound gaps (omissions) occur in this area, connect the power amplifier to the L+R terminal and use another speaker to compensate as required.
L
R
REAR

Fig. 1-2 L+R Terminals function

1.4 L+R, LINE-OUT TERMINAL

1. We recommended that the power amplifier's input sensitivity is kept about 1 volt when using this terminal. Set the unit's main volume to the proximity of the center when using an ordinary premain amplifier.
2. Use the connected amplifier to adjust the sound volume balance of the front side's L, R and L+R.

1.5 TAPE MONITOR SWITCH

To monitor turn the TAPE MONITOR SWITCH to the ON position to enforce the switch-over of the electronic switch as shown in Fig. 1-3 below.

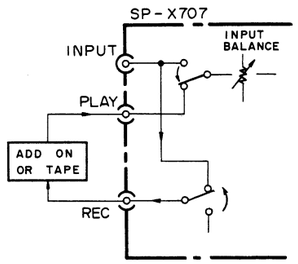


Fig. 1-3 TAPE MONITOR Switch's action

1.6 MUTING

To muting turn the MUTING switch to the ON position in order to get -∞ output terminals level (VAR/FIX/SPEAKERS/L+R/LINE OUT).

1.7 INPUT BALANCE VOLUME

The INPUT BALANCE VOLUME prevents sound emissions from the SURROUND side caused by the monaural source signals during the DOLBY SURROUND MODE.

1.8 POWER ON INITIAL SETTING

The power ON initial setting of SP-X707 is as follows:

SURROUND : OFF
Expander/Super Bass/Loudness : OFF
VOLUME : -∞

However, on account of the normal memory back up, the memory of conditions as they were just before the mains was switched OFF, are kept for several days. If the VOLUME level was set at more than 3 points on the indicator scale, then at the time of switching back ON VOLUME level reverts to the 3 point level.

1.9 ELECTRIC POWER SOURCE

When employing the WAVE SYSTEM with this unit, connect the amplifier's AC OUTLET (SWITCHED) to the electric power source and turn to the ON/OFF position.

1.10 GENERAL (MISCELLANEOUS)

The DYNAMIC EXPANDER is always OFF when the DOLBY SURROUND MODE is ON. The DYNAMIC EXPANDER cannot be turned on even when the DYNAMIC EXPANDER switch's ON/OFF positions are manipulated.

When set to a SURROUND MODE other than DOLBY or when the SURROUND is OFF, the DYNAMIC EXPANDER automatically turns to OFF if it is set to the ON position and the SURROUND MODE to DOLBY.

Switch overs to systems other than DOLBY trigger automatic resetting.

The SUPER BASS, DYNAMIC EXPANDER, and LOUDNESS cannot be simultaneously turned to the ON position. This is designed to guard against the excessively strong low-pass input which their joint use may force on the speaker.

USE WITH A GRAPHIC EQUALIZER:

SP-X707 is equipped with sound volume enlargement functions such as SUPER BASS, DYNAMIC EXPANDER, etc.

The following points must be considered when using a graphic equalizer:

1. Avoid extreme compensation (ALL MAX.) of the graphic equalizer's volume.
2. Try as much as possible to equally adjust the L and R manipulation. Inequal L and R manipulation will not achieve good results during DOLBY SURROUND due to the built-in DOLBY DECODER.

2. SYSTEM BLOCK DIAGRAM & LEVEL DIAGRAM

2.1 SYSTEM BLOCK DIAGRAM

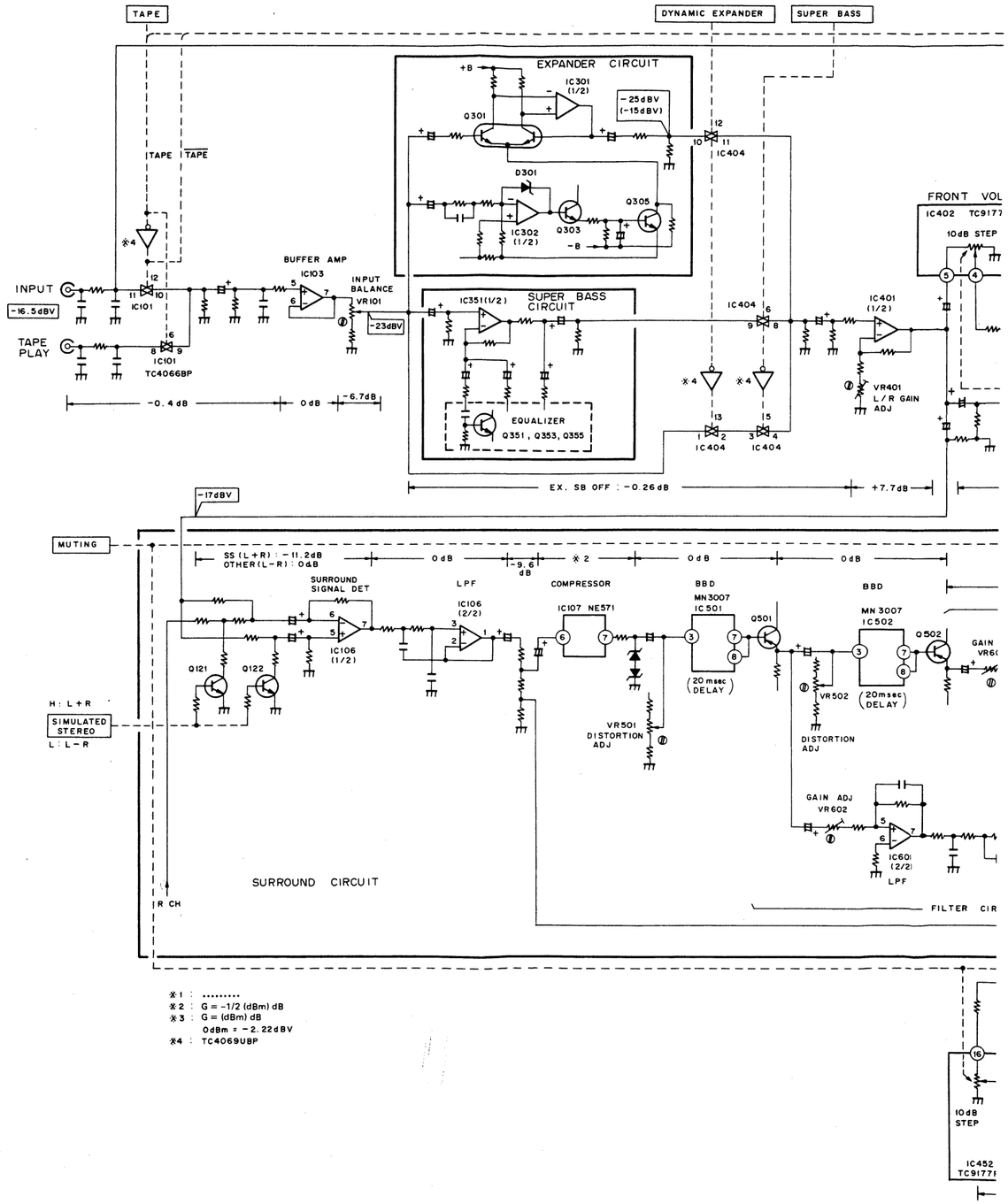


Fig. 2-1 System block dia

2. SYSTEM BLOCK DIAGRAM & LEVEL DIAGRAM

2.1 SYSTEM BLOCK DIAGRAM

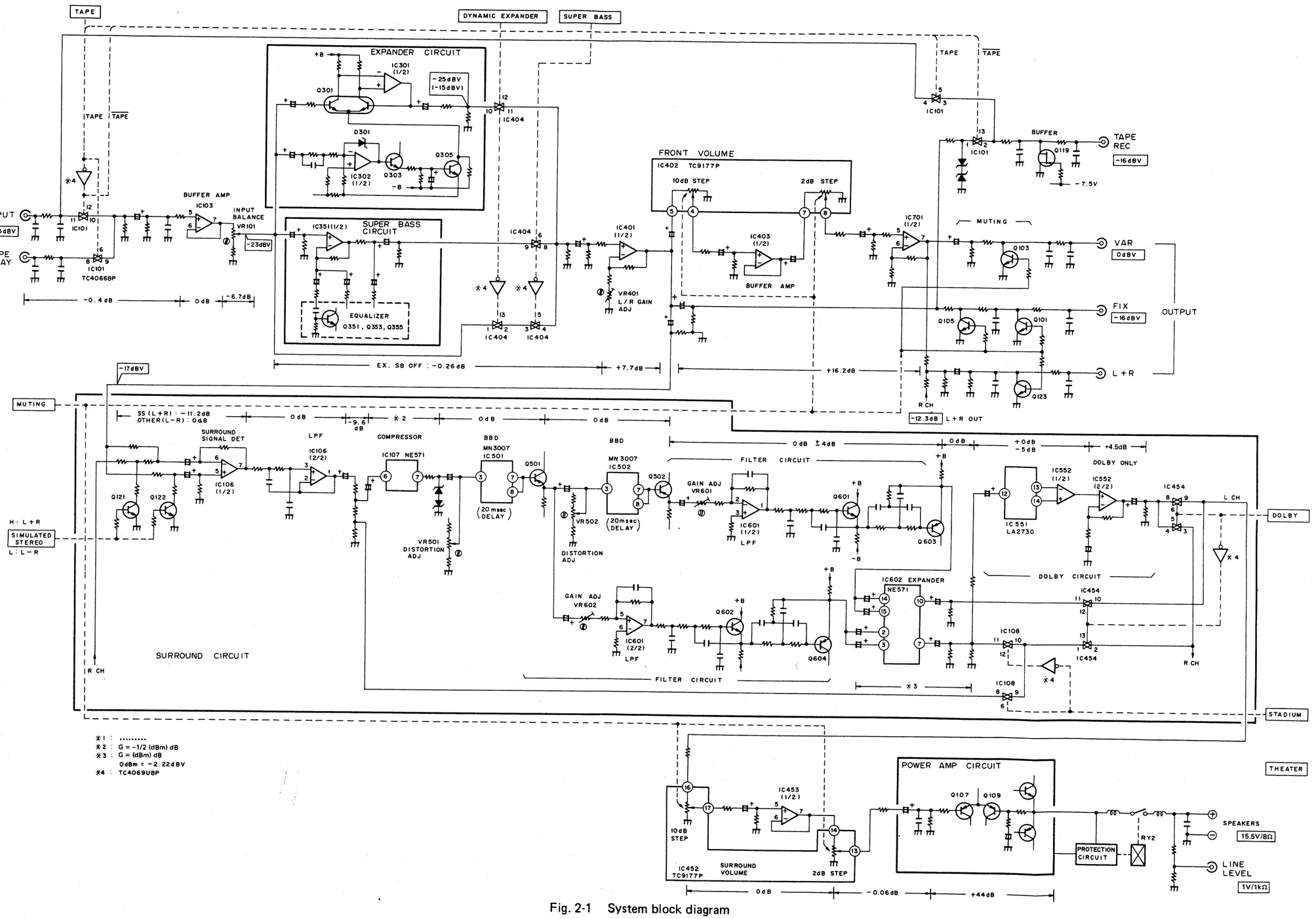


Fig. 2-1 System block diagram

2.2 LEVEL DIAGRAM

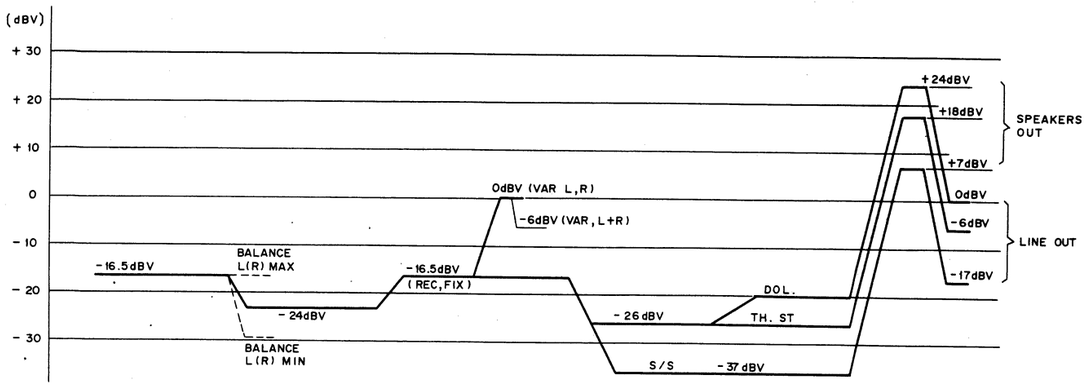


Fig. 2-2 Level diagram

3. CIRCUIT OUTLINE

3.1 SURROUND CIRCUIT

Fig. 3-1 shows Surround Circuit's block diagrams. The surround circuit produces four different ambiances appropriately combined via the delay circuit after the L ch R ch signals conduct the L-R or L+R operations.

Each of the 4 Surround circuits have outputs through the channels shown in Fig. 3-2.

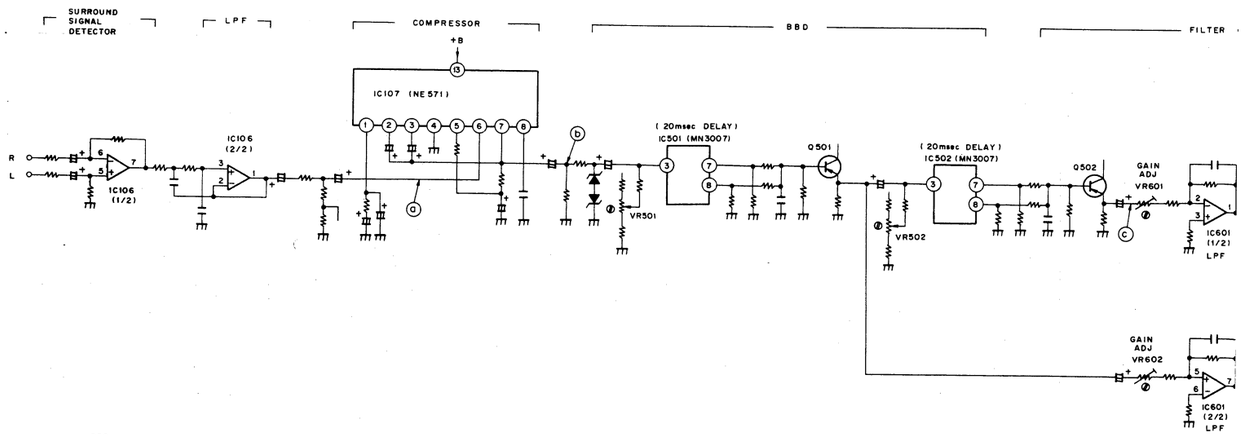


Fig. 3-1 Block diagram of surround circuit sect

3. CIRCUIT OUTLINE

3.1 SURROUND CIRCUIT

Fig. 3-1 shows Surround Circuit's block diagrams. The surround circuit produces four different ambiances appropriately combined via the delay circuit after the L ch R ch signals conduct the L-R or L+R operations.

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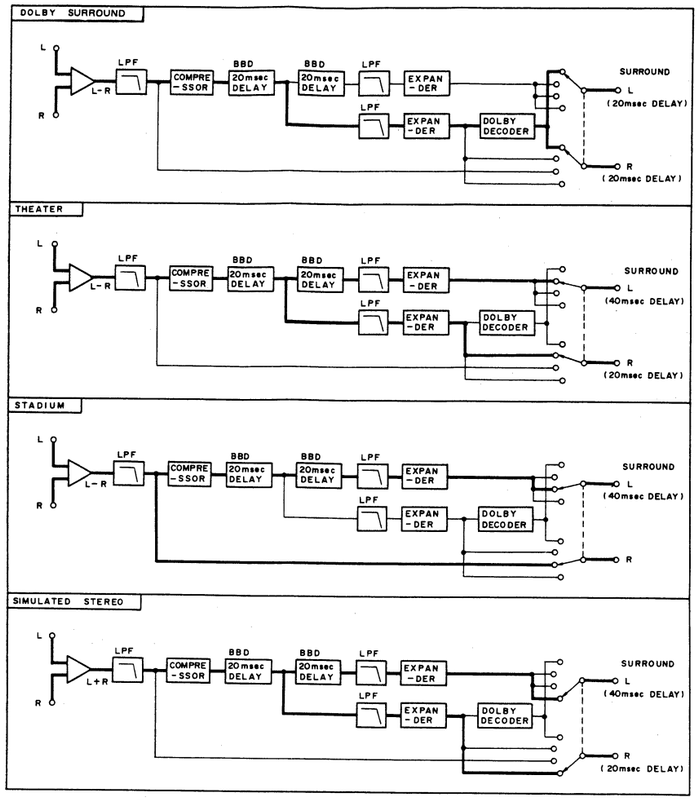


Fig. 3-2 Signal processing of each surround mode

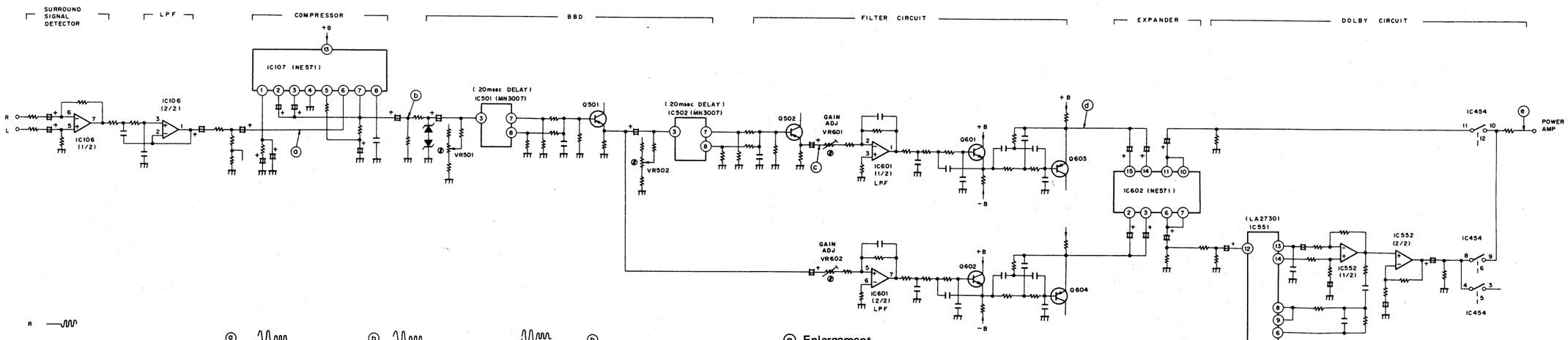
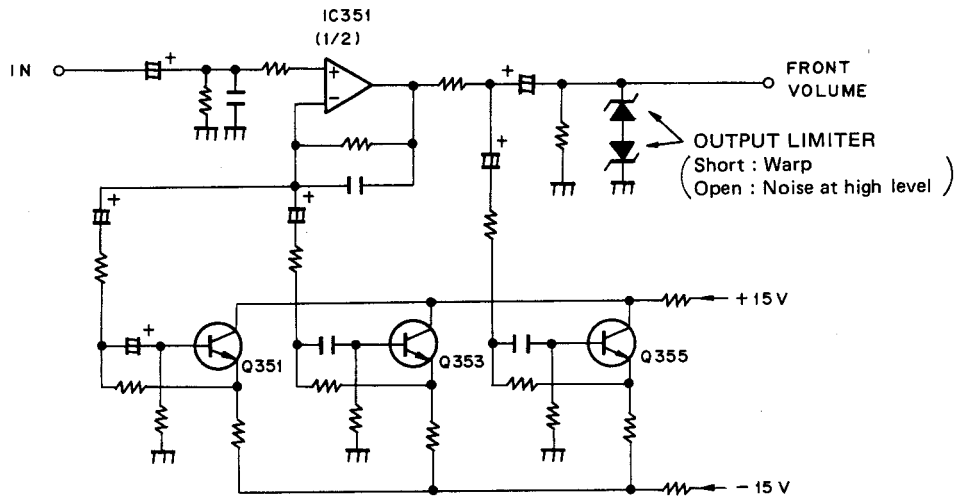


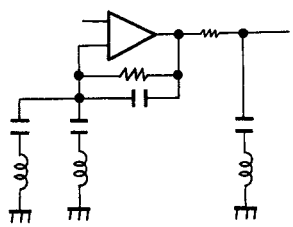
Fig. 3-1 Block diagram of surround circuit section

3.2 SUPER BASS CIRCUIT

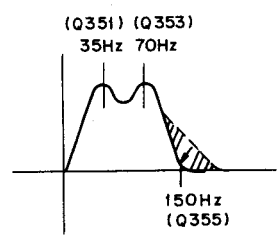
The Super Bass Circuit reinforces the super low pass (below 100Hz) of the input signal frequency. Fig. 3-3 (a) shows the compensation of Q351 to 35Hz, Q353 to 70Hz, and illustrates how the 150 ~300Hz slope is compensated at Q355 so as to make it flat. (Fig. 3-3 (c)). Q351~Q355 are equivalent L components of the resonance circuit (Fig. 3-3 (b)).



(a) Super bass circuit



(b) Equivalent circuit

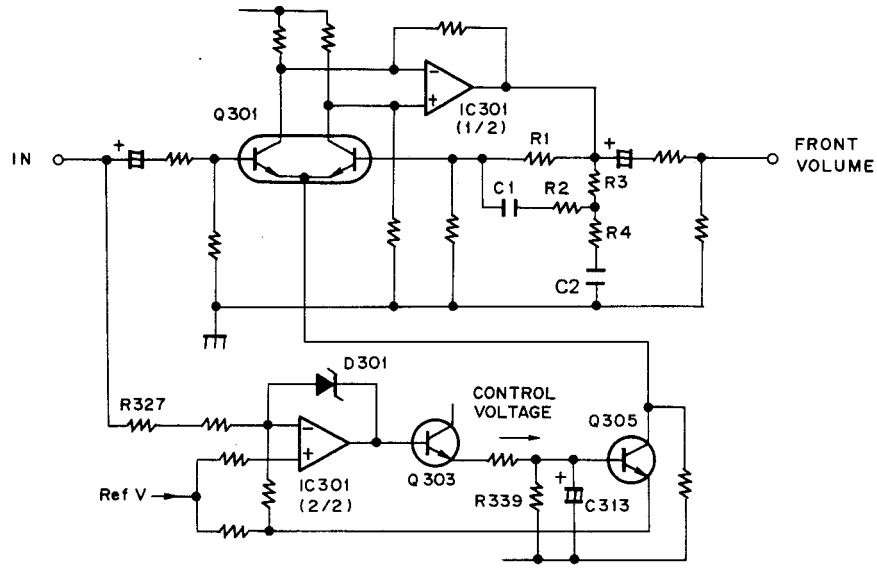


(c) Frequency response

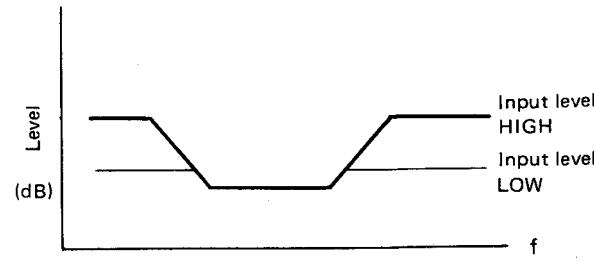
Fig. 3-3 Super bass circuit

3.3 DYNAMIC EXPANDER CIRCUIT

VCA consists of Q301, IC301 (1/2), and Q305, C1, C2, R1, R2, R3, and R4 function as frequency response equipped NF element. (Fig. 3-4 (b)) shows frequency response.



(a) Dynamic expander circuit



(b) Frequency response

Fig. 3-4 Dynamic expander circuit

4. IC DATA

4.1 PDE 009

This is a CMOS-type LSI structure 42 pin plastic package used for a 4-bit, single chip, 4096 × 8-bit ROM, 256 × 4-bit RAM microcomputer. Ensure that the 42 pin is not VDD and that the 40 Pin is VDD (+5V).

Oscillation frequency is optional and can be operated at 800kHz via a ceramic filter.

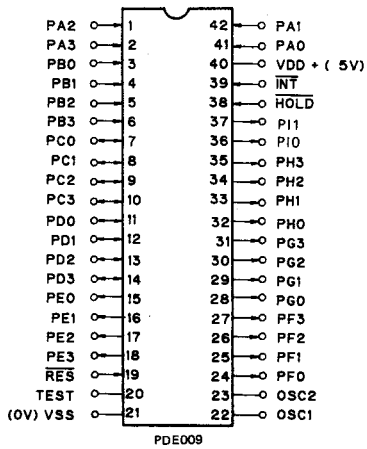


Fig. 4-1 Pin location diagram

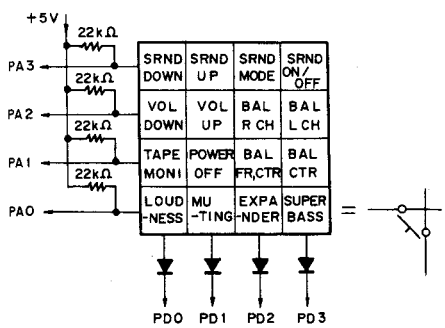


Fig. 4-2 Key-SCAN

Chart 1 Terminal Functions

Terminal	Pin No.	Function		Active
RES	19	Initial resetting input.		L
TEST	20	LSI Test terminal, Connected to Vss.		–
Vss	21	Connected to GND power source.		–
OSC1	22	Input of terminal externally attached to the resonance circuit designed for internal clock's oscillation.		–
OSC2	23	Output of terminal externally attached to the resonance circuit designed for internal clock's oscillation.		–
HOLD	38	Hold mode request input.		L
INT	39	Interruption request input (connected to PB_0 terminal).		L
Vdd	40	Power source terminal +5V.		–
PA_0	41	Key matrix return input.		L
PA_1	42			
PA_2	1			
PA_3	2			
PB_0	3	Remote control signal input.		L
PB_1	4	Component code switch over input (A0 or A0+A5).		H
PB_2	5	Surround level-indicator input.		H
PB_3	6	Loud-S, Bass-EXPD selector input.		L
PC_0	7	Remote control indicator output.		H
PC_1	8	Open circuit (Disconnection).		–
PC_2	9			
PC_3	10			
PD_0	11	Key matrix return signal source.		L
PD_1	12			
PD_2	13			
PD_3	14			
PE_0	15	TC9177 control output.	DATA1	H
PE_1	16		DATA2	H
PE_2	17		CLK	H
PE_3	18		STRB	H
PF_0	24	Surround mode control output.	THEATER	H
PF_1	25		STADIUM	H
PF_2	26		DOLBY	H
PF_3	27		S/S	H
PG_0	28	Surround ON/OFF control output.		H
PG_1	29	Tape-monitor control output.		H
PG_2	30	Expand ON/OFF control output.		H
PG_3	31	Super bass ON/OFF control output.		H
PH_0	32	PD0012A Control output.	DATA	H
PH_1	33		CLK	L
PH_2	34		CE	L
PH_3	35	Open		–
PI_0	36	Muting control output.		H
PI_1	37	Power-Relay control output.		H

4.2 LA2730

One channel, DOLBY-B type silicon monolithic IC.

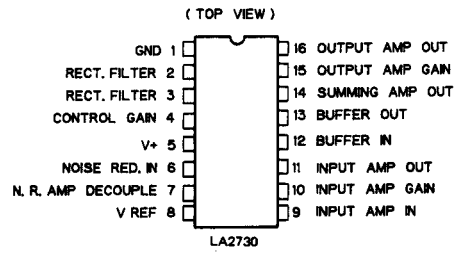


Fig. 4-3 Pin location diagram

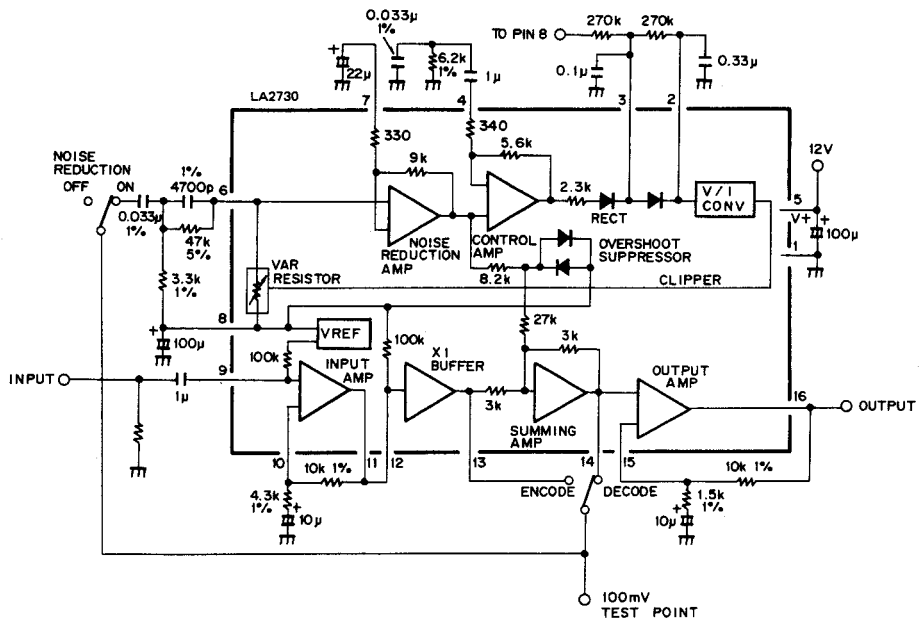


Fig. 4-4 Internal block diagram

4.3 PD0012A

Silicon Monolithic Bipolar Digital IC (I^2L).

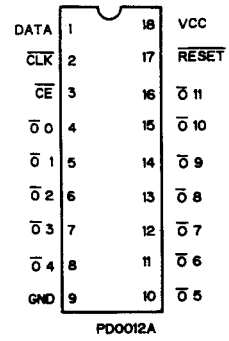


Fig. 4-5 Pin location diagram

Chart 2 Terminal Function

Number	Symbol	Function	Number	Symbol	Function
1	DATA	Data input.	10	$\overline{O}_5$	Data output.
2	$\overline{CLK}$	Clock input.	11	$\overline{O}_6$	Data output.
3	$\overline{CE}$	Counter reset input.	12	$\overline{O}_7$	Data output.
4	$\overline{O}_0$	Data output.	13	$\overline{O}_8$	Data output.
5	$\overline{O}_1$	Data output.	14	$\overline{O}_9$	Data output.
6	$\overline{O}_2$	Data output.	15	$\overline{O}_{10}$	Data output.
7	$\overline{O}_3$	Data output.	16	$\overline{O}_{11}$	Data output.
8	$\overline{O}_4$	Data output.	17	$\overline{RESET}$	Latch reset input.
9	GND	Earth terminal.	18	Vcc	Electric power source terminal.

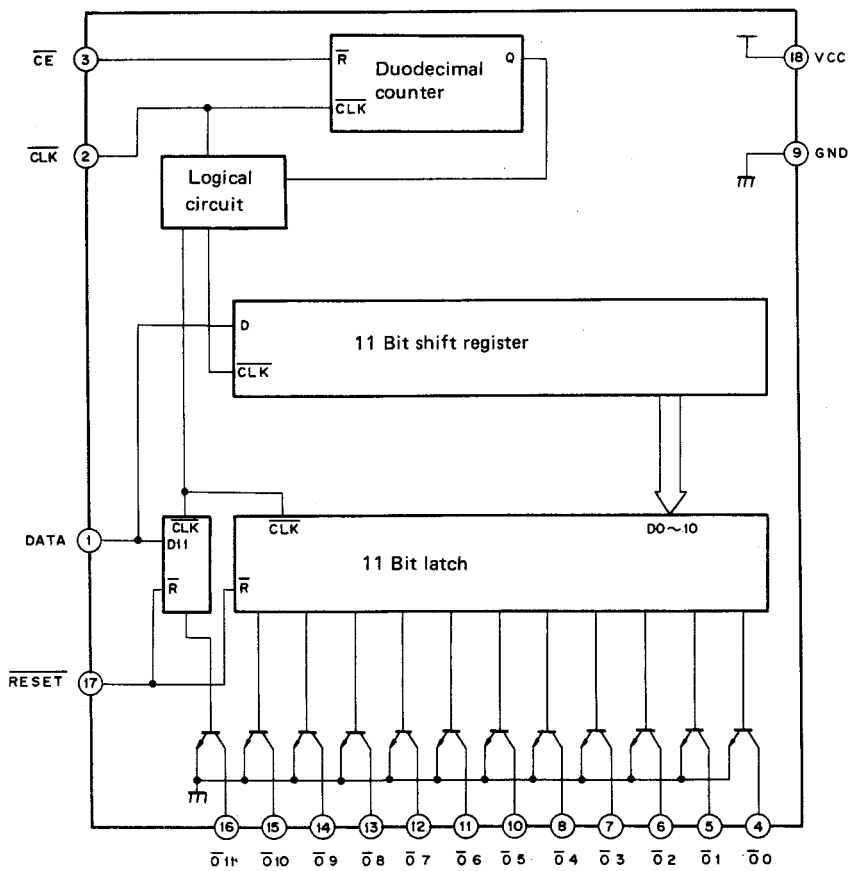


Fig. 4-6 Internal block diagram

4.4 TC9177P

Sound volume, balance, and loudness can be controlled via the externally input serial data (0~5V logical levels).
Sound Volume Adjustment : 0dB~-76dB
It is able to adjust the 40 steps sound level by 2dB steps.

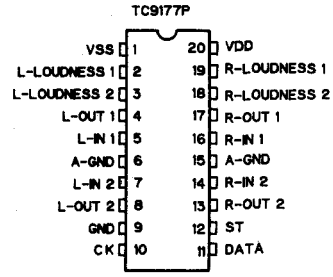


Fig. 4-7 Pin location diagram

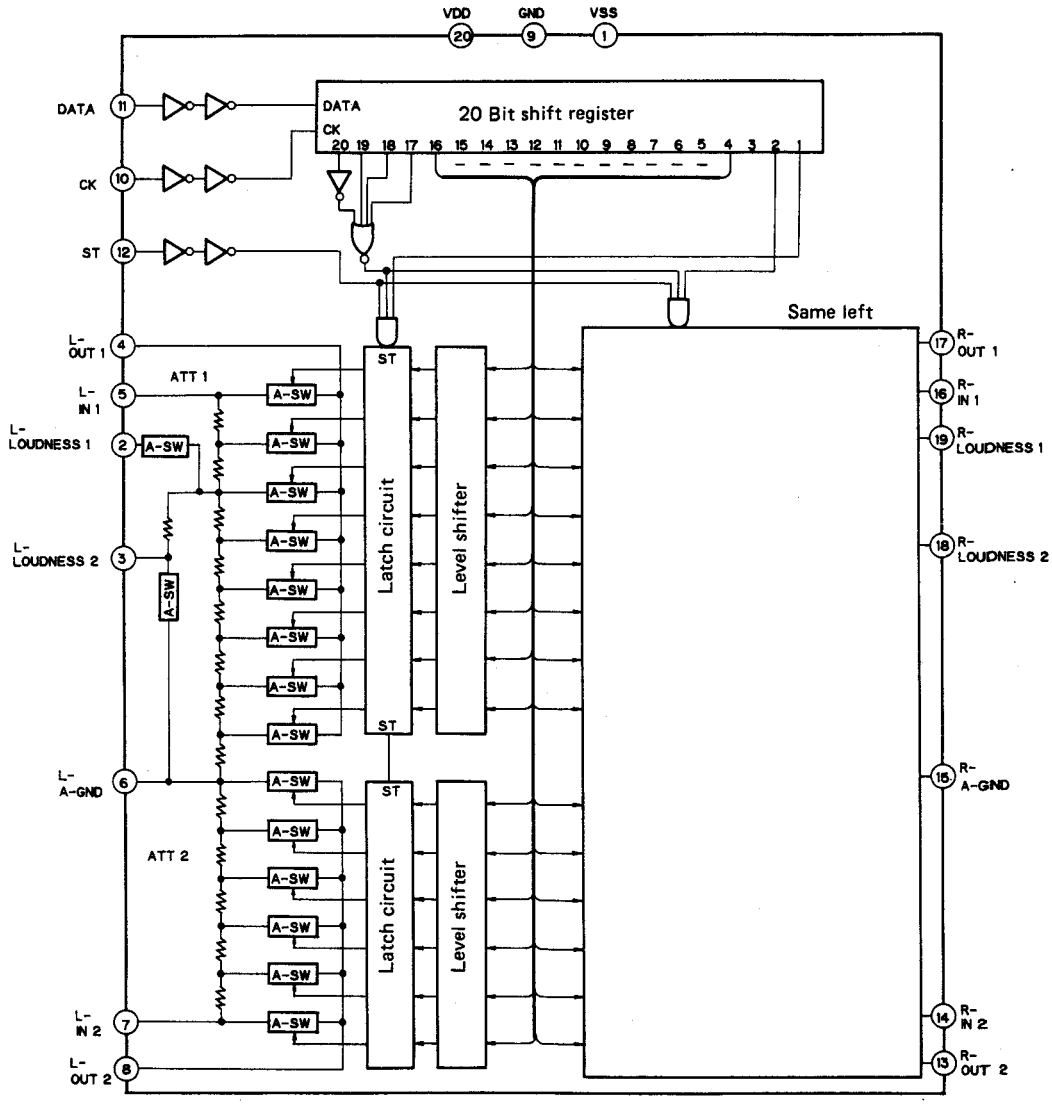


Fig. 4-8 Internal block diagram

Chart 3 Terminal Functions

Terminal Number	Code (Symbol)	Terminal Function
2, 3 19, 18	L-Loudness 1, 2 R-Loudness 1, 2	Loudness Terminal. Terminal converts to a -20dB tap terminal when loudness data is input. Loudness control is possible by connecting this terminal to a high/low pass (frequency) boost circuit.
4 17	L-OUT1 R-OUT1	10dB step attenuator output. Signals transmitted to IN are attenuated up to eight levels in the 0~-70dB range via 10dB steps.
5 16	L-IN1 R-IN1	10dB attenuator input.
6 15	A-GND	AC earth terminal.
7 14	L-IN2 R-IN2	2dB attenuator input.
8 13	L-OUT2 R-OUT2	2dB attenuator output. Signals transmitted to IN are attenuated up to five levels in the 0~-8dB range via 2dB steps.
11	DATA	Attenuated volume, channel selection data input. Consists of 20 bits, and input via CK signals.
10	CK	Clock Input. Clock input for fetching the data terminal's data.
12	ST	Strobed Input. Turning this terminal to the "H" level enables the latching of the attenuation volume and channel selection data fetched from the DATA and CK terminals. Data remains in its original state if this terminal is not turned to the "H" level.
20 9 1	V_{DD} GND V_{SS}	(+) Power source impressed terminal. Earth terminal. (-) Power source impressed terminal.

5. CONTROL SYSTEM OUTLINE

The SP-X707 microcomputer IC (PDE009) performs the following operations.

1. With Power ON, settings from previously entered memory (when the memory still contains data). It also makes initial settings (when the memory is erased).
2. Volume/Balance LED display control.
   Normally an orange light indicates the volume of the front side. When the Surround Volume control is turned UP or DOWN the light on the display will turn red, and it indicates the Surround Volume level. When L R balance or the L R centre key is operated the display will indicate "Balance" with an orange light. Whatever the mode the display returns automatically to the normal condition, ie. indicating Front side Volume after a period of approximately 4 seconds. The LED display data (including Loudness indicator) is transmitted serially by the PH0 of IC901. And with this, the expander IC904 (PD0012A) drives the LED.
3. Surround Mode Switching ("H" for a particular port. Otherwise "L").
4. Super Bass/Dynamic Expander/Mute switching. ("H" for each function).
5. Volume/Balance control.
   Serial data is sent from the PE0-3 ports of the IC901 to the Front side and the Surround side Electronic Volume IC TC9177P (IC402, IC452) for operations of the Volume, Balance, Surround Volume, Loudness and Muting.
6. ON/OFF of the TAPE MONITOR.
7. The "$\overline{\text{HOLD}}$" terminal for data memory with a power failure or the main power switch OFF is normally "H" but switches to "L" during a power failute.

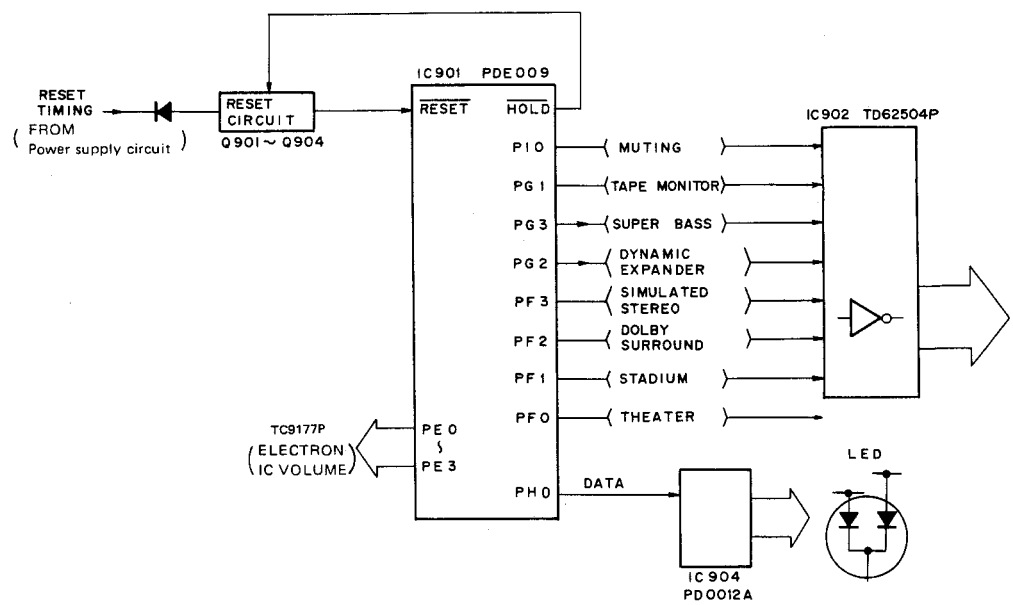


Fig. 5-1 The control system block diagram

ADDITIONAL

Service Manual

PIONEER

ORDER NO.
ARP1017-0

SURROUND AMPLIFIER

SP-X707(BK)

S/G, HB , HEZ

- For Servicing these types, please refer to the SP-X707 (BK)/KUC (KU AND KC) Service Manual(ARP1015) with the exception of this additional service manual.

- This additional service manual is applicable to the S/G, HB and HEZ types

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PIONEER ELECTRONICS SERVICE INC. P.O. Box 1760, Long Beach, California 90801 U.S.A.
TEL: (213) 420-5700
PIONEER ELECTRONIC (EUROPE) N.V. Keetberglaan 1, 2740 Beveren, Belgium TEL: 03/775·28·08
PIONEER ELECTRONICS AUSTRALIA PTY. LTD. 178-184 Boundary Road, Braeside, Victoria 3195, Australia
TEL: (03) 580-9911

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1. CONTRAST OF MISCELLANEOUS PARTS

NOTES:

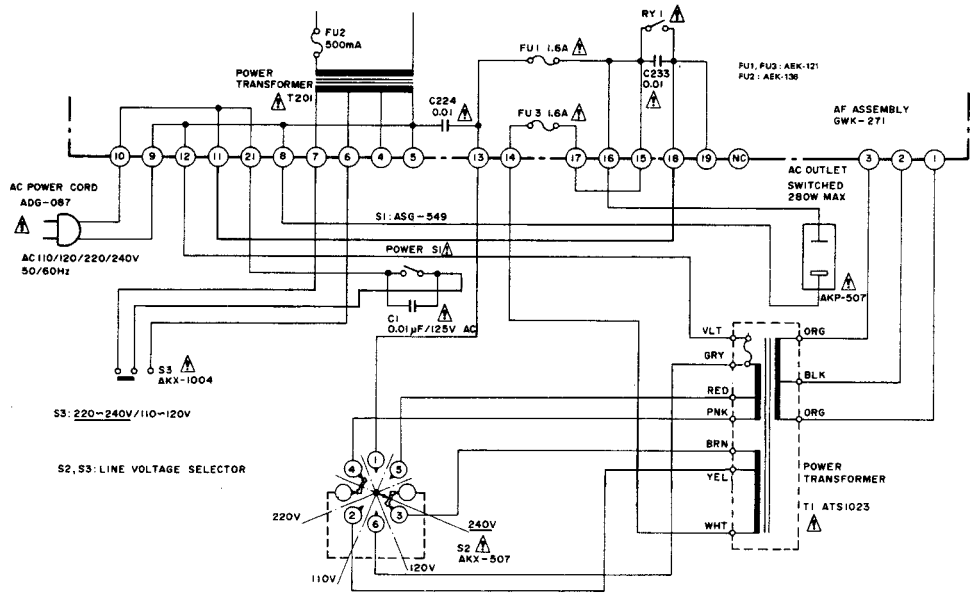
- *The ⚠ mark found on some component parts indicates the importance of the safety factor of the part. Therefore, when replacing, be sure to use parts of identical designation.*
- *For your Parts Stock Control, the fast moving items are indicated with the marks ★★ and ★.*
  ★★ GENERALLY MOVES FASTER THAN ★
  This classification shall be adjusted by each distributor because it depends on model number, temperature, humidity, etc.
- *Parts marked by " ⊙ " are not always kept in stock. Their delivery time may be longer than usual or they may be unavailable.*

SP-X707 (BK)/S/G, HB and HEZ types are the same as the SP-X707 (BK)/KUC (KU, KC) types with the exception of the following sections.

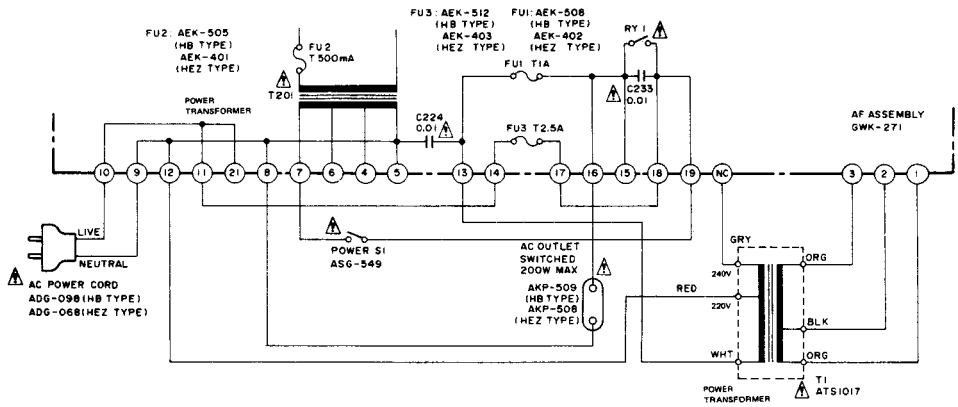
Mark	Symbol & Description		Part No.				Remarks
			KUC (KU, KC) type	S/G type	HB type	HEZ type	
⚠ ★	T1	Power transformer (AC120V)	ATS-288	.....	.....	.....	
⚠ ★	T1	Power transformer (AC110V, 120V, 220V, 240V)	.....	ATS1023	.....	.....	
⚠ ★	T1	Power transformer (AC220V, 240V)	.....	.....	ATS1017	ATS1017	
⚠		AC Socket (AC OUTLETS)	AKP-507	AKP-507	AKP-509	AKP-508	
⚠ ★★	S2	Line voltage selector	.....	AKX-507	.....	.....	
⚠ ★★	S3	Line voltage selector	.....	AKX1004	.....	.....	
⚠ ★★	FU1	Fuse (3.15A)	AEK-124	.....	.....	.....	
⚠ ★★	FU1	Fuse (1.6A)	.....	AEK-121	.....	.....	
⚠ ★★	FU1	Fuse (T1A)	.....	.....	AEK-508	AEK-402	
⚠ ★★	FU2	Fuse (500mA)	AEK-136	AEK-136	.....	.....	
⚠ ★★	FU2	Fuse (T500mA)	.....	.....	AEK-505	AEK-401	
⚠ ★★	FU3	Fuse (1.6A)	.....	AEK-121	.....	.....	
⚠ ★★	FU3	Fuse (T2.5A)	.....	.....	AEK-512	AEK-403	
⚠		AC Power cord	ADG-089	ADG-087	ADG-098	ADG-068	
		Nylon rivet	.....	AEC-510	AEC-510	.....	
		Screw (For Line voltage selector)	.....	BBZ30P080FZK	.....	.....	
		Operating instructions (English)	ARB-723	ARB-723	ARB-723	.....	
		Operating instructions (English/German/French/Italian)	.....	.....	.....	ARE1016	
		Packing case	AHE-696	AHD1075	AHE-696	AHE-696	
		Spacer (for packing)	.....	AHB1003	.....	.....	

2. SCHEMATIC DIAGRAM

For S/G type



For HB and HEZ types



Line Voltage Selection (For HEZ and HB types)

Line voltage can be changed with following steps.

1. Disconnect the AC power cord.
2. Remove the Bonnet case.
3. Change the connection of the power transformer lead wires (red and gray).

Voltage	Terminal No. 12	Terminal No. NC
220V	Red	Gray
240V	Gray	Red

4. Stick the line voltage label on the rear panel.

Part No.	Description
AAX-193	220V label
AAX-192	240V label